PREDICTORS OF COMPLEMENTARY AND ALTERNATIVE MEDICINE USE AMONG TEXAS UNIVERSITY UNDERGRADUATES

A Dissertation

by

AMY L. VERSNIK NOWAK

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

August 2005

Major Subject: Health Education

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Approved by:

Chair of Committee, Steve Dorman
Committee Members, Patricia Goodson
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Larry Ringer
Head of Department, Steve Dorman

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ABSTRACT

Predictors of Complementary and Alternative Medicine Use

Among Texas University Undergraduates. (August 2005)

Amy L. Versnik Nowak, B.A.; M.A., University of Wisconsin–Stevens Point

Chair of Advisory Committee: Dr. Steve Dorman

Research regarding use of complementary and alternative medicine (CAM) among all populations in America is needed to understand what seems to be an increasing trend. Education has been shown to be a significant determinant of CAM use, therefore, college students are likely to be CAM users. Little research has addressed the prevalence and predictors of CAM use among this population, so the purpose of this study was to: (1) measure the prevalence and type of CAM use among a sample of college undergraduates; and (2) test the significance of select social-cognitive constructs and demographics as predictors of CAM use. A random sample of undergraduate students within the Texas A&M University System was solicited via email to complete a web-based survey. Findings show high rates of CAM use. Gender, attitude toward CAM, outcome expectancies regarding the health care encounter, and social network use of CAM were shown to be significant predictors of CAM use. Results can inform health care and health education professionals interested in improving health care processes and addressing positive and negative issues related to CAM use.

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NOMENCLATURE

CAM	Complementary and alternative medicine
MEPS	Medical Expenditure Panel Survey
NCCAM	National Center for Complementary and Alternative Medicine
NHIS	National Health Interview Survey
NVNM	Non-vitamin, non-mineral
SCT	Social Cognitive Theory
TAMU	Texas A&M University
TAMUS	Texas A&M University System
WHCCAMP	White House Commission on Complementary and Alternative Medicine Policy
WHO	World Health Organization

CHAPTER I

INTRODUCTION

Research suggests use of complementary and alternative medicine (CAM) has increased in America since the middle of the 20th century, (Kessler, Davis, Foster, Van Rompay, Walters, & Wilkey, 2001). Since 1998, national studies show 67% of American adults have used at least one CAM therapy in their lifetimes (Kessler et al, 2001) while approximately 40-42% have used CAM in the past year (Astin, 1998; Eisenberg, Davis, Ettner, Appel, Wilkey, Van Rompay, & Kessler, 1998). In 2000, the World Health Organization (WHO) (2003) estimated 158 million American adults spent over $17 billion on CAM practices. Research shows with each generation, the likelihood and frequency of CAM use among U.S. adults continues to grow (Kessler et al., 2001).

Development of CAM in the United States

While national studies demonstrate increased use of CAM among the U.S. population in recent decades, CAM is not a new development. CAM therapies have developed and existed, recognized or not, throughout U.S. history (Kaptchuk & Eisenberg, 2001; Paramore, 1997). CAM use history is hard to capture as CAM therapies "are derived from diverse geographical, cultural, social, and philosophical backgrounds, as well as from different historical time periods" (Anyinam, 1990, p. 69.). Many CAM therapies developed in the same scientific era as biomedicine and some of their methods

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This dissertation follows the style of the *American Journal of Health Education.*

have been incorporated into conventional medical practice (Bakx, 1991). CAM therapies are individual and unique forms of medicine in their own right and their only link is their exclusion from practices of today's conventional medicine (Anyinam, 1990).

The historical relationship between CAM and conventional medicine has been a troubled one. It has been described as an "antagonistic," (Kaptchuk & Eisenberg, 2001) "hostile" (Anyinam, 1990), and "biased" (Konefal, 2002) history in which CAM therapies and practitioners have been undermined, discredited, and isolated from the dominant health care system (Anyinam, 1990; Bakx, 1991; Furnham & Forey, 1994). While CAM has been discredited by conventional medicine for being non-scientific, the issue is actually a power struggle over "who shall practice, rather than what those practices should be" (Bakx, 1991). Bakx (1991) indicates conventional medicine has worked to control the health care industry and eliminate competition by discrediting any form of care that does not adhere to the same scientific orthodoxy, licensing, and industrialization ideals.

Biased attitudes toward CAM are reflected in the terminology with which they have been referred. "Terms change throughout historical time periods; new names arise continuously and meanings shift. Labels often embody rhetorical stances, power relationships, and value judgements" (Kaptchuk & Eisenberg, 2001, p. 189). Wootton & Sparber (2001) claim the 1980's attitude of conventional medicine toward CAM in the U.S. was cautious and alarmist, characterized by terms such as unproven, nonproven, and questionable. In the 1990s, terms such as unorthodox, nonorthodox, unconventional, nonconventional, and the misleading "nontraditional," paint a picture of defensiveness. Alternative, complementary, or a combination of the two terms has been used often in the

past decade. More receptive attitudes toward mainstreaming CAM (Kaptchuk & Eisenberg, 2001) are reflected in the recent development of the terms integrated or integrative medicine (Wootton & Sparber, 2001).

While the historical presence of CAM is definite, it is the increasing use and recognition that has the health care professions paying attention. Freshley & Carlson (2000) state "health care in the United States is in the midst of a grassroots consumer movement" (p. 3) and other researchers agree consumers are the driving force in the resurgence of CAM (Anyinam, 1990; Bakx, 1991; Ernst, 2000). Anyinam (1990) attributes the resurgence to a holistic health movement emphasizing multi-faceted treatment of the whole person, disenchantment with conventional medical services, and changing policies regarding CAM. Changing preferences of health care consumers are increasing research and interest at the national and global levels (Konefal, 2002).

In response to increased use and interest in America over the past few decades, the growing need for CAM research has been recognized by government and world agencies. The National Center for Complementary and Alternative Medicine (NCCAM), created in 1992, and the White House Commission on Complementary and Alternative Medicine Policy (WHCCAMP), established in 2000, were designed to maximize CAM research, education, information, and access to benefit all Americans (WHCCAMP, 2004). These changes echo the global movement to research and integrate all forms of medicine to benefit all people. On the international level, the WHO (2003) is helping countries develop national policies, conduct research, and increase availability of CAM for their populations.

Health Education and CAM

As each generation continues to use more CAM practices, improved health education is needed to benefit and to protect the American people. "Most physicians are not prepared to respond knowledgeably about CAM" (Konefal, 2002, p. 847) so health educators have the opportunity and responsibility to help people make appropriate health care and health promotion choices. Health educators must be adequately prepared to present CAM therapies as viable options when discussing wellness development, disease prevention, and overall health care with their audiences. Health educators also must help protect the American public by teaching skills to determine the risks and truths associated with CAM or any form of health care treatment.

Statement of the Research Problem

Little is known about CAM use among the college population and the possible factors influencing their decision to use CAM. In light of the growing use of CAM, research must explore needs among specific populations such as American college students who have a unique set of risky and unhealthy behaviors. As new adults, most university undergraduate students are living independently and are ultimately responsible for their health and health care choices. It is important to accurately gauge their choices and understand why they choose particular health care options. Such results can provide a starting point for college health educators to successfully address CAM use with their students.

Purpose of the Study

The purpose of this study was to assess the level of CAM use among a selected sample of undergraduate students within the Texas A&M University System and determine significant predictors of use.

Theoretical Framework: Social Cognitive Theory

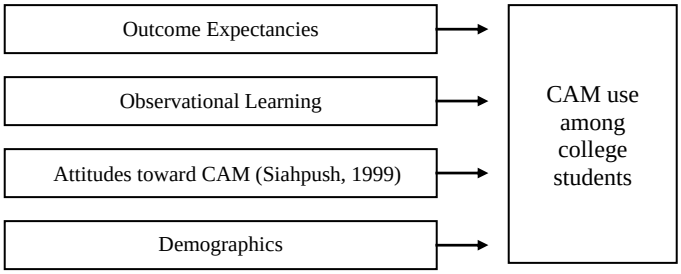
This study was based on Bandura's Social Cognitive Theory (SCT) which is derived from the assumption that future behaviors are determined by an interaction of behavioral, personal, and environmental influences. First introduced in 1941, SCT has been used across a wide range of psychological, behavioral, and health situations to explain how people acquire and maintain personal behavior patterns (Glanz & Lewis, 1997). It suggests a person will choose to perform an activity to minimize a negative outcome and maximize a positive one.

While many of the SCT components might play a role in determining health care choices, this study examined two SCT constructs, outcome expectancies and observational learning, and their relationship to CAM use. Outcome expectancies are the values an individual places on an outcome. It is believed that high outcome expectancies regarding health care outcomes increases the likelihood of choosing those methods, while individuals with lower outcome expectancies will choose those methods less or not at all. Observational learning relates to the impact of role models upon a behavior. To be more precise: if people in a student’s social network use CAM therapies, the student will be

more exposed to increased opportunities to observe the use of CAM and, thus, perhaps, learn the behavior and use it him/herself.

One additional theoretical construct, used by Siahpush in 1999, was added to the SCT constructs and tested in this research. Siahpush used a scale of attitudes toward CAM in a study involving an Australian population (Siahpush, 1999). One limitation of his research was that it did not test the relationship of the attitude variable to actual CAM use. That relationship will be tested among this college population. In addition to the theoretical constructs, demographics also were assessed as possible predictors of CAM use. The relationships studied are demonstrated in Figure 1.

Figure 1. Theoretical relationships being studied.



Research Questions

Five research questions guided the study:

- What is the reported CAM use among undergraduate students enrolled within the Texas A&M University System?
- What is the relationship between perceived outcome expectancies and CAM use among the college population?

- How is CAM use affected by observational learning?
- What is the relationship between attitude toward CAM and reported CAM use among these students?
- Which demographic groups are more likely to use CAM?

Among these relationships, it was believed that demographic patterns would follow similarly to patterns found in the general American population. Higher scores for outcome expectancies, observational learning, and attitude toward CAM were expected to correlate with higher CAM use among the college population.

Research Variables

This study examined four independent variables (outcome expectancies, observational learning, attitude toward CAM, and demographics) and their influence upon one dependent variable: CAM use.

Research Design

Quantitative data were gathered using a web-based survey design of a single sample with sub-groups.

Study Population

The study population consisted of all undergraduates with a university email account enrolled during the Fall 2004 semester at eight Texas A&M University System schools.

Instrumentation

Scales were developed to measure outcome expectancies and observational learning, while the attitude toward CAM scale was adopted with permission from Siahpush (1999). CAM use was measured in two ways: CAM use since starting college and CAM use ever in the lifetime. Demographic variables also were assessed. A pilot test was conducted to test instrument validity and data reliability.

Data Collection

Randomly-selected participants were solicited via email using repeated mailings over a three to four week period based upon Dillman's (2000) tailored design method. Examples of the e-mail communications are found in Appendix A. Each e-mail linked participants to a website where they received information about the study. Participants agreed to participate by selecting a "Go to Survey" button and they were linked automatically to another website and asked to enter a generic password involving their school and the current semester (example: TAMU Fall 2004). From there, they entered the survey as anonymous and voluntary participants. Responses were gathered electronically using the software "SurveySelect ASP." Data were exported into Microsoft Excel for initial clean-up and then imported into SPSS version 12.0 for analysis.

Data Analysis

Reliability and factor analyses were conducted on the attitude, observational learning, and outcome expectancies scales. Frequencies were used to check for missing data and to assess the number and types of CAM practices used by the sample.

Correlations were used to examine relationships between variables. Multiple regression procedures were used to determine significant predictors of CAM use. Additional analyses were used to clarify or explore initial findings.

Limitations

Limitations of a research design should be considered when interpreting study results. According to Dillman (2000), the strengths of a web-based survey include its low-unit cost, high speed of returns, use of visual aids to present information, and the ability to ask complex or a series of questions. From the respondent perspective, there is more time for answering and respondents are not influenced by the presence of an interviewer, which increases the likelihood of answering sensitive questions accurately. Limitations of a web-based study include computer literacy of users and technical capacity of the computers (Dillman, 2000). In addition, students might have other email accounts they use rather than the university accounts, which may prevent students from receiving the email. There is also great competition for time among school, family, work, and social commitments. Students might not feel their participation is important. Generalizability of results is a concern also. Results from this study can only be generalized to undergraduates in the Texas A&M University System who had access to the solicited emails during the study.

While the limitations are recognized, they also can be addressed. Today's undergraduate students are highly computer literate and have access to technologically up-to-date computers at their university. Some universities use email as the primary route for communication versus paper mailings. As vital university information is being routed

to the emails provided by the open access records, students are more likely to be using those email addresses regularly. Competition for time can be addressed by making the survey a length that does not distract from their other commitments and solicitation emails can be written to explain the importance of each student's input. Requests for research participation are unique events and may draw their interest. While generalizability is limited, other universities and health educators can use the results as starting points for health education development and research.

Additional limitations that should be considered when interpreting results include:

1) The randomly-selected sample might not be representative of the entire student population enrolled in participating TAMU System schools during the Fall 2004 semester. Due to the anonymity of responses, there was no way to compare characteristics of respondents to those of non-respondents.
2) Two of the 10 TAMU System schools would not provide email addresses for their student population due to concerns regarding privacy, so the results can not be generalized to the entire TAMU System undergraduate population.
3) Students who opted to keep their email addresses excluded from open access record lists were not included in the lists provided by participating schools.
4) Students vary in their use of university email as their primary email account, which might limit the number of students who actually received the solicitation emails.
5) The solicitation emails might have been labeled "bulk mail" or "junk mail" by the host server and, therefore, not read by potential participants.

6) Voluntary participants might not be representative of the undergraduate population at the participating schools.
7) Email communication and web-based survey methods were the only forms of notification and data collection used.
8) Computer accessibility and knowledge could have been problematic for solicited participants.
9) Study participation might have been difficult for people who are not computer-literate or were not able to comprehend or comply with instructions given.
10) Incompatibility with computer hardware and software might have limited participation in the study.

Delimitations

The following delimitations set by the researcher might affect interpretation of results:

1) Participants were randomly selected from the undergraduate population enrolled in the Fall 2004 semester at eight TAMU System schools.
2) Participants were required to have a university email account.
3) Participation was voluntary and anonymous.
4) Participants must have had access to email and a computer with adequate capabilities to participate in the study.
5) Participants were required to have a certain level of computer knowledge to open the email and use the internet to access and participate in the study.

6) Participants needed to be able to comprehend and comply with the given instructions.
7) Data were collected during a one-month period in the Fall 2004 semester.

Assumptions

The following assumptions were made:

1) All TAMU System students have an email account registered with the university they attend.
2) Only a small portion of the students would elect to keep their email private from open records lists.
3) The undergraduate students in the TAMU System who had a university email account which could be purchased from their university during the Fall 2004 semester were considered representative of the true undergraduate population at the participating universities.
4) Fall 2004 undergraduates with accessible university email accounts were considered an appropriate source from which to solicit participants.
5) The sample of undergraduates with accessible email accounts were considered representative of the entire undergraduate population at the participating TAMU System schools.
6) Electronic communication and a web-based survey were considered appropriate to answer the research questions with the study population.
7) Potential participants had the knowledge, skills, and access to comprehend and comply with study instructions.

8) The voluntary and anonymous participants were representative of the undergraduate population enrolled during the Fall 2004 semester at the participating TAMU System schools.
9) Participants accurately recalled and reported their use of CAM therapies and accurately estimated their beliefs and attitudes regarding CAM.

Definition of Terms

The White House Commission on Complementary and Alternative Medicine Policy (2004) claims "boundaries between CAM and mainstream medicine, as well as among different CAM systems, are often blurred and are constantly changing" (n.p.). Conventional medicine is usually understood as the main form of health care used in industrialized nations, and it includes what most Americans think of as health care: the use of drugs, surgery, and radiation to treat, remove, or repair symptoms. The same understanding does not hold true for all Americans as concepts of CAM vary on an individual basis and are influenced by social and cultural norms. CAM is often defined as "a group of diverse medical and health care systems, practices, and products that are not presently considered to be part of conventional medicine" (NCCAM, 2004, n.p.). Complementary therapies are used in conjunction with conventional care and considered alternative when used in place of conventional treatment. Unlike conventional approaches, the goal is to support the body's natural ability to prevent, treat, and heal itself from disease. CAM includes, but is not limited to, all systems and therapies indicated in Figure 2.

This study involves many CAM therapies and, therefore, many definitions. To maintain continuity among research, exact or shortened versions of definitions employed

Figure 2. Major categories of CAM therapies (WHCCAMP, 2004).

Major domains of CAM	Definition	Examples
Alternative health care systems	Based upon complete systems of theory and practice. Usually a long history before conventional medicine.	Ayurveda Chiropractic Homeopathy Native American medicine Naturopathic medicine Traditional Chinese medicine
Mind-body interventions	Focuses on developing mind's relationship to the body and its ability to assist in healing.	Meditation Hypnosis Guided imagery Dance therapy Music therapy Art therapy Prayer and mental healing Patient support groups Cognitive-behavioral therapy
Biologically based therapies	Uses natural substances to treat the patient.	Dietary supplements Herbal therapies Special diets Orthomolecular medicine Individual biological therapies
Manipulative and body-based methods	Involves manipulation and/or movement of one or more parts of the body.	Chiropractic or osteopathic manipulation Therapeutic massage Feldenkrais Alexander method
Energy therapies **Biofield therapies** **Bioelectromagnetic-based therapies**	Influences energy fields that surround and penetrate the human body.	Qi gong Reiki Therapeutic touch Magnet therapy

by the CDC's National Health Interview Survey were used (Barnes, Powell-Griner, McFann, & Nahin, 2004) (Appendix B). Geographic regions are identified in Appendix C (Barnes et al., 2004).

Summary

Chapter I provided the basic overview and components of this study regarding CAM use and predictors of CAM use among a university population. It explained why the study was needed; what the guiding research questions were; how the study was designed to best answer the questions; limitations, delimitations, and assumptions associated with the current study; and definitions to help the reader understand terms included in the research. Chapter II provides a review and critical assessment of the literature regarding prevalence of CAM use in the United States and research regarding psychosocial predictors of CAM use.

CHAPTER II

LITERATURE REVIEW

CAM use and predictors of CAM use among the college population are not well-studied. This chapter reviews and analyzes literature regarding these two areas of interest. The first section focuses on general population studies assessing CAM use among American adults. Studies are addressed individually, followed by a summary and in-depth critical analysis of study methods and results. The second section involves research conducted on predictors of CAM use. It is followed by a summary of findings and an in-depth critical analysis. Following these two sections, need for the present study is addressed in light of the reviewed literature and a theoretical model is proposed for understanding and studying CAM use among the college population.

Use of CAM in the United States

Over the past decade, national surveys have assessed prevalence of CAM use in the United States. A combined search of databases, articles, bibliographies, and the world wide web yielded a dozen national studies for review. These 12 studies are quantitative in nature, are concerned mainly with general rates of CAM use among U.S. adults, are based on data from U.S. nationally-focused data sets, define CAM use as at least one CAM therapy in the past year, and are published in peer-reviewed journals. Studies not meeting the above criteria, such as studies conducted outside of the U.S. or focused on specific therapies, conditions, or populations, were excluded from the review.

Twelve studies, including primary and secondary analyses conducted between 1993-2004, met inclusion and exclusion criteria. A summary of findings regarding data sources and rates of CAM use is found in Figure 3. All were based on survey data and response rates ranged from 60% to 75%. All data originated from seven data sets:

- a 1990 survey by Eisenberg et al. (Eisenberg, Kessler, Foster, Norlock, Calkins, & Delbanco, 1993);
- the 1994 Robert Wood Johnson Foundation National Access to Care Survey (Paramore et al., 1997);
- a survey by National Family Opinion, Inc. (Astin, 1998);
- the 1996 Medical Expenditure Panel Survey based on the 1995 National Health Interview Survey (Bausell, Lee, & Berman, 2001; Druss & Rosenheck, 1999; McFarland, Bigelow, Zani, Newsom, & Kaplan, 2002);
- a 1997 follow-up survey by Eisenberg et al. (Eisenberg et al., 1998; Kessler et al., 2001);
- 1999 National Health Interview Survey (Ni, Simile, & Hardy, 2002); and
- the Alternative Health/Complementary and Alternative Medicine supplement, the Sample Adult Core component, and the Family Core component of the 2002 National Health Interview Survey (Barnes et al., 2004).

Sample sizes ranged from 1500 to over 31,000 and the number of CAM therapies included in the studies ranged from four to 22 (27 if Barnes et al.'s six "diet-based therapies" are counted separately, and 30 if the four "prayer for health" sub-groups are counted separately).

Figure 3. Summary of studies regarding CAM use in the United States.

Authors	Date of Publication	Purpose	Sample Size	Population	Method or Source of Data	# of CAM therapies used in analyses	Definition of Use	Rate of Use	Significant findings regarding use p<.05 or lower
Eisenberg, Kessler, Foster, Norlock, Calkins, & Delbanco	1993	prevalence, costs, and patterns of CAM use in 1990	1539	general population, U.S. adults, 18+, English-speaking, in households with phones, ability to complete survey	Telephone, randomized, 67% response rate	16	at least one CAM therapy in past 12 months (excluding exercise and prayer) and lifetime use	33.8% of adults had used at least one CAM therapy in 1990	**higher use** among ages 25-49, with some college education, income over $35K, living in West; **lower use** among blacks
Paramore	1997	update & improve national estimates of use, compare users and non-users	3450	U.S. population, civilian, noninstitutionalized	national probability sample of the 1994 Robert Wood Johnson National Access to Care Survey, 75% response rate	4	at least one CAM therapy in past 12 months	10% of all Americans (including children)	higher use among 19-64, white, with some college education, living in the West, non-HMO enrollees
Astin	1998	develop tentative explanatory models to account for increasing use of CAM	1035	general population, U.S. adults, 18+, English-speaking, in households with phones, ability to complete survey	Mail survey, conducted through National Family Opinion, Inc., participants recruited from panel, 69% response rate	17	at least one CAM therapy in past 12 months	40%	**higher use** among more educated, cultural creatives, transformational experience that changed worldview, poorer overall health, holistic health philosophy
Eisenberg, Davis, Ettner, Appel, Wilkey, Van Rompay, & Kessler	1998	document trends in use between 1990 & 1997	2055	general population, U.S. adults, 18+, English-speaking, in households with phones, ability to complete survey	Telephone, randomized, 60% response rate	16	at least one CAM therapy in past 12 months (excluding exercise and prayer) and lifetime use	42.1% had used at least one CAM therapy in 1997	significant rate of increase between 1990 and 1997; significant increase in use among 10 of the 16 therapies; **higher use** among women, ages 35-49, some college education, income over $50K, living in West; **lower use** among blacks
Druss & Rosenheck	1999	determine association between use of CAM and conventional care	16,068	noninstitutionalized civilian U.S. adults 18+, including non-English-speaking and individuals without phones	probability sample of 1996 Medical Expenditure Panel Survey (MEPS) using the 1995 National Health Interview Survey (NHIS) sampling frame, 77.7% response rate	11 + "other" category, practitioner-based therapies only	at least one CAM therapy in 1996	6.5% of all Americans had used at least one CAM in the past year	**higher use** among female, white, more education, living in the West
Bausell, Lee, & Berman	2001	determine relationship of demographic & health-related variables to CAM practitioner use	16,068	noninstitutionalized civilian U.S. adults 18+, including non-English-speaking and individuals without phones	probability sample of 1996 Medical Expenditure Panel Survey (MEPS) using the 1995 National Health Interview Survey (NHIS) sampling frame, 77.7% response rate	11 + "other" category, practitioner-based therapies only	at least one visit to CAM practitioner in 1996	9% of all Americans had visited at least one CAM practitioner in the past year	higher use among ages 40-49, female, white, more education, poorer health, living in the Midwest

Figure 3 Continued.

Authors	Date of Publication	Purpose	Sample Size	Population	Method or Source of Data	# of CAM therapies used in analyses	Definition of Use	Rate of Use	Significant findings regarding use p<.05 or lower
Kessler, Davis, Foster, Van Rompay, Walters, Wilkey, Kaptchuk, & Eisenberg	2001	trends over past half century	2055	U.S. adults, 18+, English-speaking, in households with phones, ability to complete survey	Telephone, randomized, 60% response rate	20	at least one CAM therapy in past 12 months (excluding exercise and prayer), lifetime use, and age at first use	67.6% had used at least one CAM therapy in lifetime	Significant increases in use among 17 of 20 CAM therapies since the 1950s;
McFarland, Bigelow, Zani, Newsom, & Kaplan	2002	examined relationships between race, geography, and conventional care to visits to CAM practitioner	16,400	noninstitutionalized civilian U.S. adults 18+, including non-English-speaking and individuals without phones	probability sample of 1996 Medical Expenditure Panel Survey (MEPS) using the 1995 National Health Interview Survey (NHIS) sampling frame, 77.7% response rate	4	at least one visit to CAM practitioner in past 12 months	5% had visited at least one CAM practitioner in past 12 months	rates of significance not specified, though higher use was shown among women, ages 20-64, high school education or higher, whites, living in the West
Ni, Simile, & Hardy	2002	measure CAM use	30,801	U.S. adults, 18+, civilian, noninstitutionalized	1999 National Health Interview Survey (NHIS) & Sample Adult Core questionnaire, 70% response rate	12 plus "others" category	at least one CAM therapy in past 12 months	28.9% had used at least one CAM therapy in past 12 months	**higher use** among women, ages 35-54, higher education, living in Midwest or West
Barnes, Powell-Griner, McFann, & Nahin	2004	estimates of CAM use among U.S. adults	31,044	U.S. adults, 18+, English-speaking, in households with phones, proxy answers for adults not able or available to complete the survey	the Alternative Health/Complementary and Alternative Medicine supplement, the Sample Adult Core component, and the Family Core component of the 2002 National Health Interview Survey, 74.3% response rate	27 plus prayer for health	at least one CAM therapy in past 12 months and lifetime use	**Rates of use (prayer excluded):** 36% had used at least one CAM therapy in past year, 49.8% in lifetime; **Rates of use if prayer included:** 74.6% lifetime, 62.1% past year	**higher use** among women, older adults, higher education; many more significant findings that dependent upon inclusion or exclusion of megavitamins and/or prayer for health reasons

Some of the most well-known research was conducted by Eisenberg et al. in 1993 with a follow-up study in 1998. Initial findings of the randomized telephone survey of 1,539 people reported 34% of participants had used a CAM therapy at least once in the past year and indicated $13.7 billion dollars were spent annually on CAM therapies. The follow-up study in 1998 (n=2,055) showed a significant increase in annual CAM use to 42% between 1990 and 1997. Researchers also found significant increases in 10 out of 16 therapies included in the study. Being female, middle-aged, non-black, more educated, and of a higher income bracket increased the likelihood respondents would be CAM users. Eisenberg et al.'s studies set the precedent for CAM use research.

Based on the same data as Eisenberg et al. (1998), Kessler et al. (2001) did not address CAM use as did other studies in this review. The purpose was to study trends of use over the second half of the 20th century. Use was assessed in three ways: use in past year, use ever in lifetime, and age at first use. According to the data, 67.6% of respondents reported using at least one CAM therapy in their lifetime. Seventeen of the 20 therapies included demonstrated significant increases in use by the adult American population since the 1950s. The study demonstrated likelihood of CAM use increases and the age at first CAM use decreases with each passing generation. In short, CAM use begins at younger ages and continues throughout the lifetime. This could be a reflection of the consumer "grassroots movement" affecting health care as suggested by Freshley & Carlson (2000).

Studies by Paramore (1997) and Astin (1998) were based upon data collected from private organizations. Paramore assessed use among four practitioner-based

therapies among 3,450 respondents and estimated only 10% of Americans (including children) were CAM users. Astin, on the other hand, included 17 therapies and estimated 40% of the adult population used CAM based on a sample size of 1,035. Paramore found higher use among whites ages 19-64, with some college education, living in the western part of the country, who are not members of HMOs. Astin also found education was significant with CAM users tending to have more education. These findings are consistent with Eisenberg et al. (1993, 1998).

Druss & Rosenheck (1999), Bausell et al. (2001), and McFarland et al. (2002) all published articles analyzing CAM use from the same 1996 Medical Expenditure Panel Survey (MEPS) data set (based on the 1995 National Health Interview Survey [NHIS]) . All therapies were practitioner-based. Druss & Rosenheck and Bausell et al. assessed use of 11 therapies (plus an "others" category) while McFarland et al.'s analysis involved only four therapies. Unlike other studies reviewed here, respondents included less affluent people without phones and people who could not speak English. Estimates of annual CAM use among these studies were the lowest among all the studies. Estimates ranged from 5% to 9%. Findings were consistent with other research regarding demographics of CAM users: female, white, with more education, living in the West and Midwest.

Findings by Ni et al. (2002) continued to follow demographic patterns related to CAM use found in previous studies. Women, ages 35-54, with higher education, and who live in the West or Midwestern United States, were more likely consumers of CAM therapies than other populations. Based upon the 1999 NHIS, 12 CAM therapies (plus an

"others" category"), of which the majority were practitioner-based, suggested a 28.9% of the U.S. adult population had used at least one CAM therapy during the previous year.

While Eisenberg et al. (1993, 1998) began the trend, the most recent and arguably the most significant and encompassing study regarding CAM use in America was published in 2004. Conducted by Barnes et al. (2004), *Complementary and Alternative Medicine Use Among Adults: United States, 2002*, is being touted as the "most complete and comprehensive findings to date on Americans' use of CAM" (NCCAM, 2004). The study explored the who, what, and why of CAM use with the intention to focus on minority and disadvantaged populations underrepresented in previous studies.

Estimated rates of CAM use in the past year were similar or higher than findings of all other studies to date. Rates of lifetime use ranged from 49.6% to 74.6%, depending upon the exclusion or inclusion, respectively, of "prayer for health" as a CAM therapy. Between 36% (prayer excluded) and 62.1% (prayer included) had used CAM in the past year. The overall higher rates, compared to findings from Eisenberg et al., could be due to an actual increase in use, but also could be due, at least in part, to inclusion of more CAM therapies as variables. Fifty-five percent of people who had used CAM in their lifetime also had used it in the past year suggesting people use CAM continuously throughout their lifetimes vs. only as a one-time experience.

Who is using CAM? Barnes et al. (2004) reported CAM use was likely to increase with age and education level (except prayer). Women, former smokers, urban dwellers, and those in the hospital during the past year showed higher rates of use than males, current smokers or lifetime abstainers, rural dwellers, or non-hospitalized people. The outcomes changed dramatically when prayer and/or megavitamins are included or

excluded from the analyses. When prayer and megavitamins were included, no difference was found for income level, however, findings show the following groups of people are more likely to use CAM than their counterparts:

- African Americans than Whites or Asians;
- former drinkers than current drinkers or lifetime abstainers;

When prayer was excluded, the following group was more likely to include CAM users:

- those who live in Pacific Coast states than other states;

When both prayer and megavitamins were both excluded, more differences were found to increase the likelihood of CAM use among different groups:

- Asian than White or African American;
- current drinkers than former drinkers or lifetime abstainers;
- income over $75K and less than $20K.

Barnes et al.'s study is valuable in its ability to demonstrate the role CAM has in the lives of many groups of Americans and how inclusion or exclusion of a single variable can make all the difference in reported estimates.

What type of CAM is being used? Barnes et al. (2004) found only 12% of the population used the services of a CAM practitioner, while the remaining 88% are self-treating with CAM therapies. Other than prayer, the leading CAM therapies used by Americans included natural products (18.9%), deep breathing (11.6%), meditation (7.6%), and chiropractic (7.5%).

Why are they using CAM? When use of megavitamins and prayer were excluded from Barnes et al.'s (2004) analysis, the top five reported conditions for which CAM therapies were sought were back pain (16.8%), head cold (9.5%), neck pain (6.6%), joint

pain (4.9%), and arthritis (4.9%). The next five included anxiety/depression, stomach upset, headache, recurring pain, and insomnia, which were primary causes for care among another 15% of respondents.

Summary CAM Use Studies

The studies reported a range of information and estimates on CAM use in the United States as demonstrated in Figure 3. The studies were designed to assess many aspects of CAM use in America including:

- prevalence, cost, patterns, and predictors of use;
- differences between users and non-users;
- short-term and long-term trends in use;
- use of CAM in relation to use of conventional medicine; and
- perceptions of users of both CAM and conventional services

In doing so, these studies paint an imperfect but honest picture of CAM use in America. While people from all socio-demographic backgrounds are users of CAM, there is an overwhelming consensus among demographic characteristics of many CAM users. The reviewed studies show people who are female, white, middle-aged, more affluent and more educated, living in urban areas in the western and mid-western parts of the country, and experiencing chronic health conditions, are more likely to use CAM therapies. Increasing use of CAM, as findings demonstrate, suggest CAM is a force to be reckoned with and considered in the health care market.

Critical Analysis of CAM Use Studies

The reviewed national studies have their strengths and weaknesses. Large sample sizes increase the generalizability of results to the national population and to represented sub-groups. Sample sizes ranged from 1,035 to 31,044; however, response rates between 60% and 75% suggest a considerable portion of solicited respondents opted not to participate in the studies. No information was provided on these non-participants and their use of CAM. Some studies involved only the 48 contiguous states while others involved all 50 states and the District of Columbia. In most cases, data were weighted to account for variations in the sample and make the data representative of the civilian, non-institutionalized adults in the United States (Paramore, 1997).

While the findings are useful, they are inconsistent and not based on truly representative samples. All the surveys employed random sampling methods to attempt a fairly representative sample of U.S. residents. Most used computer-assisted telephone surveys or extensive mail surveys designed to reach English-speaking civilian adults at least 18 years of age who live in households with telephones and have the physical and mental ability to complete the survey. Individuals who could not speak English, who lived in shelters, on the streets, or in institutions, and impaired people were excluded from the majority of studies (Eisenberg et al., 1993). Underrepresentation of these populations could inflate results regarding rates of use (Astin, 1998).

As Astin (1998) suggested, methods leading to underrepresentation of certain groups of people do affect national estimates of CAM use. National estimates of CAM use in the past year ranged from 5% to 67.6%. It could be that use actually increased or

decreased in the years the surveys were conducted or that the reported information was incorrect, however it seems findings are a direct result of the number of therapies included in the study and the sampling frame. Studies reporting lowest estimates also included the least amount of therapies in their study. In addition, the studies that excluded non-English-speaking people without phones and households provided much higher estimates of use than those based on the 1996 Medical Expenditure Panel Survey (based on the 1995 National Health Interview Survey) which included those groups of people. Non-MEPS studies most likely were surveying more affluent, more educated, and more employed people than MEPS studies. As such, studies based on the MEPS might provide a more accurate picture of use; however, this could only apply to practitioner-based therapies included in their data which, according to Barnes et al. (2004) accounts for only 12% of CAM use. Paramore (1997) was not MEPS-based but it did report a lower estimate of CAM use at 10%. This is likely due to its inclusion of only four therapies and its inclusion of children in the population (the only study reviewed to do so).

Estimates of use also varied greatly among specific CAM therapies. For example, chiropractic was one of three CAM therapies measured in all 10 studies. National estimates for chiropractic ranged from 3.3% to 15.8% of the population using the therapy in the past year. The lowest estimates come from studies based on the 1996 MEPS (Bausell et al., 2001; Druss & Rosenheck, 1999; McFarland et al., 2002) and the highest from the two studies conducted by private organizations (Paramore, 1997; Astin, 1998). In between were estimates from Eisenberg et al. (1993, 1998) which were somewhat higher than the most recent assessments by Ni et al. (2002) and Barnes et al. (2004).

Variations even exist within studies using the same data and caution with interpretation is suggested. Among the three studies based on the same 1996 MEPS data, researchers used different numbers of therapies in their analyses (ranging from four to 11) and even reported different rates of use for the same therapies. With chiropractic, it was reported 3.3%, 3.6%, and 4% of the population used the therapy by Druss & Rosenheck, Bausell et al., and McFarland et al., respectively. Different estimates from the same data suggest error due to calculation or to rounding off. It is unclear which is the case.

Use of paper and computer-assisted telephone interviews has inherent limitations involved with each methodology. Recall bias and self-report are always concerns for accuracy in human survey research and may inflate or deflate results (Eisenberg et al., 1998). Accuracy of responses is based upon the ability and the willingness of respondents to answer accurately (Barnes et al., 2004). Person-to-person interviews may elicit less truthful responses as people might feel uncomfortable with the question or they might provide answers they believe the interviewer wants to hear.

Varying definitions and meanings of CAM terms cause problems on several levels. Fortunately, the studies shared a two-part definition and measurement of "CAM use" that included use ever of a CAM therapy and use of at least one CAM therapy in the past 12 months. Such consistency in all areas would make comparisons simpler; however, the consistency ends there. On the main operational level, there is lack of consensus regarding the basic definition of CAM itself (Druss & Rosenheck, 1999) which filters into dissimilarities in therapies included and how those therapies are labeled or grouped. Too many variations make comparisons a challenge, if not an impossibility.

Tables 1 and 2 provide a comparison of therapies used in national studies and demonstrates how the range in number and type of therapies included can affect rates of use. Only three therapies were included in all reviewed studies: chiropractic, massage therapy, and acupuncture. Many of the more commonly included therapies are practitioner-based which leaves out the 88% of CAM use based on self-treatment, according to Barnes et al. (2004). The influence of a single variable was demonstrated by Barnes et al. who ran two analyses: one in which "prayer for health reasons" was included with the other CAM therapies and one with it excluded. With prayer included in the definition of CAM, 74.6% have used some form of CAM in their lifetime and 62.1% have used CAM in the previous 12 months before the survey. With prayer excluded the numbers drop from 74.6% to 49.8% (difference of 24.8%) for lifetime use and 62.1% to 36% (difference of 26.1%) use in the past year. Inclusion or exclusion of a single sub-variable in the definition of CAM use can drastically alter study estimates.

Table 1. Comparison of number of therapies assessed in national studies regarding CAM use.

	CAM Use Study	# of Therapies Assessed
a	Eisenberg et al., 1993	16 plus prayer & exercise
b	Paramore, 1997	4
c	Astin, 1998	17
d	Eisenberg et al., 1998	20 plus prayer
e	Druss & Rosenheck, 1999	12
f	Bausell et al., 2001	11 + "others"
g	Kessler et al., 2001	20
h	McFarland et al., 2002	4
i	Ni et al., 2002	12 + "others"
j	Barnes et al., 2004	27 including prayer for health reasons

Table 2. Prevalence of CAM use reported by national studies of the general adult population.

Therapy	Studies Assessing the Therapy	Mean Rates of Use Across All Studies	Mean Rates of Use Per Study (*Studies listed at bottom of table correlate with the following letters.)									
			Study **A**	Study **B**	Study **C**	Study **D**	Study **E**	Study **F**	Study **G**	Study **H**	Study **I**	Study **J**
	N	%	%	%	%	%	%	%	%	%	%	%
Acupuncture	10	0.9	0.4	0.8	X	1.0	0.6	0.7	X	1.0	1.4	1.1
Aromatherapy	2	5.6				5.6			X			
Ayurveda	1	0.1										0.1
Biofeedback	8	0.5	1.0		X	1.0	0.1	0.1	X		0.5	0.1
Chelation	2	0.1				0.1						0.0
Chiropractic	10	8.7	10.1	15.8	15.7	11.0	3.3	3.6	X	4.0	7.6	7.5
Color Therapy	1	n/a										
Commercial Diet	4	3.4	3.9			4.4			X			2.0
Art Therapies	1	n/a										
Deep Breathing	1	11.6										11.6
Energy Healing	6	1.7	1.3		X	3.8			X		1.1	0.5
Exercise for health	2	16.6	26.0		7.2							
Folk Remedies	6	1.5	0.2		X	4.2			X			0.1
Herbals & NVNMs	8	7.8	2.5		X	12.1	1.8	2.0	X		9.6	18.9
Homeopathy	9	1.5	0.7		X	3.4	0.4	0.6	X	0.4	3.1	1.7
Hypnosis	8	0.5	0.9		X	1.2	0.1	0.1	X		0.5	0.2
Imagery Techniques	6	3.1	4.2		X	4.5			X		1.7	2.1
Lifestyle Diet	8	3.8	3.6		8.0	4.0	1.1	1.3	X		6.9	1.8
Massage Therapy	10	5.2	6.9	6.0	X	11.1	2.0	2.3	X	2.0	6.4	5.0
Meditation	3	2.9					0.5	0.7				7.6
Megavitamins	5	3.6	2.4		X	5.5			X			2.8
Naturopathy	3	0.5				0.7			X			0.2
Neural Therapy	1	1.7				1.7						
Osteopathy	1	n/a							X			
Other	2	0.4					0.4				0.3	
Prayer for Health	3	35.1	25.0			35.1						45.2
Psychotherapy	1	n/a			X							
Qi Gong	1	0.3										0.3
Relaxation	7	7.9	13.1	3.2	6.9	16.3			X		5.0	3.0
Self-help groups	3	3.6	2.3			4.8			X			
Spiritual Healing	7	5.5	4.2		X	7.0	1.4	1.4	X		13.7	
Tai Chi	1	1.3										1.3
Traditional Medicine	2	0.4					0.3	0.4				
Yoga	2	5.1							X			5.1

(A) Eisenberg et al., 1993; (B) Paramore, 1997; (C) Astin, 1998; (D) Eisenberg et al., 1998; (E) Druss & Rosenheck, 1999; (F) Bausell et al., 2001; (G) Kessler et al., 2001; (H) McFarland et al., 2002; (I) Ni et al., 2002; (J) Barnes et al., 2004. X= exact numbers not provided.

Additional measurement error can happen as the terms and phrases used in the surveys are interpreted by respondents differently than intended or differently from other respondents (Astin, 1998). Inclusion of therapies such as over-the-counter vitamins, prayer, meditation, exercise, and relaxation as CAM therapies has been questioned as many people consider them more mainstream or conventional (Braun, Halcón, & Bearinger, 2000). Whether one considers a therapy to be conventional, alternative, or complementary is a matter of individual experience and culturally-influenced perspective rather than simple categorization. Kessler et al. (2001) recognize the trouble involved with the ever-evolving labels of CAM and its therapies. This is especially a concern when surveying multi-generational, multi-cultural, multi-socioeconomic populations as words will have different meanings, connotations, and recognizability among different groups of people.

Predictors of CAM Use

A second literature review revealed a growing body of evidence demonstrating the significance of values, attitudes, and beliefs in choosing health care. Cambridge Scientific Abstracts (ERIC, MEDLINE, PSYCINFO, and Sociological Abstracts) and Academic Search Premier were searched using combinations of the keywords complementary medicine or alternative medicine and utilization or predictors. Thirty-six and almost 400 non-duplicated articles surfaced, respectively. Additional sources were found by searching the bibliographies of found articles.

Several inclusion and exclusion criteria were applied. Studies were intended to provide empirical support regarding characteristics of CAM users, reasons people choose

CAM, attitudes toward conventional care outcomes, beliefs of CAM users, and social influences upon CAM use. Quantitative and qualitative studies, but not reviews or commentaries, were included. While peer-review was required, studies were not limited to those conducted in the United States and no requirements were set for sample selection. Articles were selected based upon their pertinence regarding predictors of CAM use, especially involving behavioral constructs, among a general population. Studies were excluded if they focused on very specific populations (e.g., cancer patients, those with HIV, military populations, hospitalized or seriously ill, elderly, health plan members) that were considered too far removed to be generalizable to the general or college population of CAM or conventional medicine users.

After inclusion/exclusion criteria were applied, 23 articles remained for review. Publication dates range from 1991 to 2004 and the studies, in most cases, comprised smaller sample sizes than the national studies previously reviewed. Though studies in this section measure behavioral variables, the vast majority of them made no mention of specific theories that guided their selection and measurement of constructs. The constructs used, however, were the same or similar to constructs (e.g., efficacy, perceived benefits, locus of control, and social networks) found in the popular health behavior theories. The studies are addressed in chronological order by year of publication and then alphabetically by the first author's last name. A synthesis (see Figure 4) and analysis of findings follows.

Figure 4. Summary of studies regarding predictors of CAM use.

Authors	Date of Pub.	Purpose	Sample Size	Males: Females	Sample	Sample Source	Location	Method	Therapies included
Finnigan	1991	determine demographic characteristics & psychological factors of CAM users	38	7:31	ADULTS	users of "touch for health" therapy system and randomly selected community group	England (Southampton)	Paper Survey & Face-to-Face Interviews	3
Furnham & Forey	1994	examine health-related beliefs of two groups: visitors to general practitioners and visitors to CAM practitioners	160 (80 from each group)	60:100	ADULTS	recruited from randomly selected practitioners of 5 modalities	unknown	paper survey	32
McGregor & Peay	1996	investigate factors associated with choice of CAM use in a CAM group and a community group	166 (85 from CAM group, 81 from community)	18:67 and 25:56	ADULTS	national sample of English-speaking adult participants recruited from panel of the National Family Opinion, Inc.	Australia (near Sydney)	telephone interviews with structured questionnaire	1
Kelner & Wellman	1997 a & b	**study a)** examine motivations behind users of 4 CAM therapies and conventional care users **study b)** compare characteristics among the 5 types of practitioners	300 (60 from each therapy)	75:225	ADULTS	recruited from randomly selected practitioners of 5 modalities	Canada	qualitative… face-to-face interviews, semi-structured, 1 hour, recorded by hand and tape, variety of locations except practitioners' offices	5
Astin	1998	investigate possible predictors of CAM use	1,035	532:503	ADULTS	national sample of English-speaking adult participants recruited from panel of the National Family Opinion, Inc.	United States	Mail survey	17
Siahpush	1998	tests relative importance of 3 hypotheses on attitudes toward CAM: medical outcome, medical encounter, and postmodern values	209	66:143	ADULTS	non-institutionalized adult residents randomly selected with two-stage probability sampling technique	Australia	telephone interviews with structured questionnaire	0
Gaedeke, Tootelian, & Holst	1999	to study familiarity, use of, and perceptions of CAM by college students	485	224:249	COLLEGE STUDENTS	stratified sample of upper and lower division classes, west coast university of 23,000, 84.2% juniors and seniors	California	5-page paper survey distributed by instructors of 17 classes, spring term 1997	8
Owens, Taylor, DeGood	1999	explore psychological factors (effectiveness, affect, absorption) of CAM use in 2 outpatient samples and 1 community sample	186	90:96	ADULTS	adult outpatients at a cancer center and pain management center as well as community	Virginia & Charlottesville	paper survey and structured interviews	25

Figure 4 Continued.

Authors	Date of Pub.	Purpose	Sample Size	Males: Females	Sample	Sample Source	Location	Method	Therapies included
Siahpush	1999	investigate determinants of attitudes toward alternative medicine and verify dissatisfaction with conventional medicine has two dimensions	787	298:489	ADULTS	non-institutionalized adult residents randomly selected with two-stage probability sampling technique	Australia	telephone interviews with structured questionnaire	0
Furnham	2000	examine attitudes of general population towards homeopathy as well as predictors of those attitudes, investigate effects of knowledge and experience with CAM on beliefs about homeopathy	433	139:291	ADULTS	two sources: 70% purchased from research agency for representative adult sample, 30% recruited from university subject panels	England & London	paper surveys with cash incentive	39
Oldendick, Coker, Wieland, Raymond, Probst, Schell, & Stoskopf	2000	inform physicians of CAM use for effective care in a state-based investigation	1,548	591:965	ADULTS	adults (large black minority, rural, and low-income population)	South Carolina	phone survey, random-digit dialing	8 categories
Conner, Kirk, Cade, & Barrett	2001	to test fit and role of various variables the Theory of Planned Behavior and to explore beliefs underlying dietary supplement use	400	0:400	WOMEN	stratified random sample from the UK Women's Cohort Study sub-group of 15,000 women	United Kingdom	paper survey and food diaries	1
Eisenberg, Kessler, Van Rompay, Kaptchuk, Wilkey, Appel, & Davis	2001	document perceptions about CAM among users of CAM and conventional medicine	831	not specified	ADULTS	randomly selected national sample of English-speaking U.S. adults in 48 contiguous states	United States	telephone surveys	20
Newberry, Berman, Duncan, McGuire, & Hillers	2001	assess use of nonvitamin, nonmineral (NVNM) dietary supplements in college population	272	114:158	COLLEGE STUDENTS	randomly selected enrolled undergrads at Washington State University	Unites States (Washington State University)	204 by mail survey followed by 68 follow-up telephone surveys of mail non-respondents	1 therapy (22 herbal supplements and 13 non-herbal supplements)
Martin, Jordan, Vassar, & White	2002	determine prevalence and characteristics of adult supplement users	326	88:234	ADULTS	recruited in person at three grocery store parking lots, metropolitan area, 6 month time span at different times of the day	Toledo, Ohio	paper survey	5 categories with "other" category including 12 therapies

Figure 4 Continued.

Authors	Date of Pub.	Purpose	Sample Size	Males: Females	Sample	Sample Source	Location	Method	Therapies included
Rafferty, McGee, Miller, & Reyes	2002	investigate feasibility of Behavioral Risk Factor Surveillance System (BRFSS) to assess CAM use	3,764	1491:2273	ADULTS	BRFSS survey participants	Michigan	supplement to the BRFSS annual population-based telephone survey	11
Wilson & Klein	2002	examine prevalence of CAM among adolescents in a New York county	361	137:224	ADOLESCENTS	random selection of adolescents 14-19 using phone method	Monroe County, New York	telephone surveys	16
Chng, Neill, & Fogle	2003	Assess CAM use among college students	913	328:585	COLLEGE STUDENTS	convenience samples of 683 undergraduate and 230 graduate students, age range 18-62	University of North Texas	paper surveys	7 therapies
O'Callaghan & Jordan	2003	examine relationship between postmodern variables, demographics, and attitudes toward three CAM therapies	171	61:110	ADULTS	volunteers solicited from university and suburban area, ages 16-65	Australia (Griffith University, Gold Coast)	paper survey	4
Sharma, Haas, & Stano	2003	study identified predictors of practitioners selected for back pain among 2 cohorts	1414 and 1598	681:734	ADULTS	baseline of an on-going longitudinal, non-randomized, practice-based observational study involving 65 MD and DC clinics	Oregon	paper survey and observation	2
Barnes, Powell-Griner, McFann, & Nahin	2004	present data from 2002 NHIS	31,044	not specified, weighted data	ADULTS	U.S. adults, 18+, English-speaking, in households with phones, proxy answers for adults not able or available to complete the survey	United States	extensive in-person interviews	27 plus prayer for health
Feldmann & Hergenroeder	2004	determine prevalence and predictors of folk and traditional medicine use among Mexican-American adolescents	182	not specified	ADOLESCENTS	14-19 years old, recruited from youth groups in American southwestern city	southwestern city in the United States	paper surveys	not specified
Huang & Slap	2004	compare rates and patterns of CAM use between 11-21 year olds and 17-21 year old sub-group	4,227	not specified	ADOLESCENTS	2705 households with phones	United States	secondary analysis of 1996 MEPS	11 (based upon other MEPS studies)

Finnigan (1991) conducted a study involving a small sample of 38 CAM users in Britain (31 female, 7 male). Findings suggest two groups of CAM users: one whose values are consistent with the CAM philosophy and one whose participants do not share those same values as strongly. Finnigan believed values-driven CAM users choose CAM due to high commitment to their values and beliefs as well as their internal locus of control. The other group of CAM users displayed less commitment and a more external locus of control, expressing they chose CAM as a last resort because of the inability of conventional medicine to help them. Referrals or recommendations that motivated use of CAM came from friends (n=17, 45%), doctors (n=13, 34%), and relatives (n=3) as well as other sources (n=5, 13%). The CAM users in Finnigan's study preferred a CAM provider to a general practitioner citing the following reasons: more friendly and personal, more of a partnership, given more time, holistic approach, and understood illness better.

Again in Britain, Furnham & Forey (1994) surveyed 160 Londoners, half of which were seeing a general practitioner and half using a variety of CAM practitioners. The majority of the sample was male, between 25-40 years old, single, and employed. CAM users were more likely to have higher education, be vegetarian, and report less time spent with practitioners. CAM users report higher effectiveness and competence of CAM providers than non-CAM users. They do not believe CAM is only for ill patients and that treatment should only concentrate on symptoms vs. the whole person. CAM users also demonstrated more consciousness, awareness, and knowledge of health and the body as well as a more internal health locus of control.

McGregor & Peay (1996) conducted telephone interviews of 85 CAM users and 81 community members in Australia. They explored topics including satisfaction with recent conventional and CAM treatment, medical histories, health locus of control, and unconventionality. Overall, CAM users were more satisfied with their CAM health care outcomes than conventional outcomes and demonstrated less confidence of efficacy of medical doctors than CAM providers. Authors note that CAM users were less satisfied than the general population but did not consider themselves dissatisfied. This suggests studies measuring satisfaction/dissatisfaction as a dichotomous variable might be missing some valuable information as the degree or strength of a belief can change study conclusions. CAM users consider themselves conventional. Authors paint a picture of CAM users as those whose values are in line with CAM more than conventional medicine, who refuse to accept outcomes of conventional medicine, and have higher self-efficacy and inner locus of control regarding health. "A picture begins to emerge of a group characterized by a greater determination to make their own decisions about the best ways in which to deal with their own health problems" (p. 1376). Values and outcomes are important in making health care choices.

Kelner & Wellman (1997a) applied Andersen's socio-behavorial model of health care utilization to the study of CAM users of five CAM treatments (family medicine, chiropractic, acupuncture/Chinese medicine, naturopathy, and Reiki) in Canada. Andersen's model suggests health care use is determined by a combination of predisposing, enabling, and need for care factors. Predisposing factors (i.e., demographics) found Canadian CAM users are similar in gender, education, occupational level, social class, and age to CAM users in the U.S. and the U.K. Major differences in

beliefs regarding individual responsibility were found between health care choosers. Respondents were asked who they believed was the person "most helpful" in improving their health. Among CAM users, 38% chose themselves as the best help, while only 15% of family care patients believed the same. On the flip side, 70% of the family care patients believed the medical doctor was the best source of help, compared to 20% of the CAM users. More CAM users (21%) than family care patients (12%) claimed a partnership with the doctor was the best help. Several reasons were indicated as reasons for CAM use: failure of conventional medicine to help (22%) , CAM principles in line with the individual's (28%), chronic health problems affecting daily life (89%), previous positive experience with CAM (13%), and recommendation by others who had been helped by CAM (36%). Recommendations or referrals were made mainly by those within the individual's close social network (i.e., family members, friends, acquaintances, co-workers) though some were made by other CAM providers and general practitioners.

Astin's 1998 study was the only U.S. national study reviewed in the previous section whose purpose was to investigate predictors of CAM use. His study was also the only one to rely solely on an extensive mail survey for data collection. People who use CAM are more likely to have higher education, a holistic view of health, poorer health status, and/or a chronic condition (Astin, 1998). In many cases, CAM users have had a life experience that significantly changed their worldview. Dissatisfaction with, or negative attitudes toward, conventional care did not predict use of CAM; however, perceived efficacy, or belief that a certain outcome will result from treatment, was indicated as the possible primary determinant of CAM use. Respondents indicated three main perceived benefits of their CAM use: (1) it relieves or removes their symptoms, (2)

it is more appropriate treatment for their specific condition than conventional medicine, and (3) CAM promotes their health instead of focusing on their illness.

In 1998, Siahpush, tested three hypotheses found in the literature to explain people's attitudes toward CAM: dissatisfaction with health outcomes of conventional medicine, dissatisfaction with doctor/patient interaction patterns in conventional medicine, and postmodern value system among consumers. Postmodern values encompass a value system including, but not limited to, preference for natural products, rejection of authority, and individual responsibility. Using a telephone survey of 209 randomly-selected adults in Australia, CAM was defined as use of naturopathy, acupuncture, herbal medicine, and chiropractic. Siahpush concluded demographics and dissatisfaction with health outcomes of conventional medicine are not predictors of attitudes toward CAM. However, dissatisfaction with the medical encounter and postmodern values held by the consumer are significant determinants of favorable attitudes toward CAM. The medical encounter, or doctor-patient relationship, was criticized for not having enough time with the doctor, not being provided with enough information on their illness, and for being doctor-centered instead of mutually participative. Findings suggest today's health consumers feel strongly about certain outcomes of a health care visit. While results are useful, small sample size and location of the survey limit its generalizability. Two sub-scales had low reliability of responses in the current population. The study did not report how these outcome expectancies predicted actual use of CAM.

Gaedeke, Tootelian, & Holst (1999) conducted a study regarding use and perceptions of CAM in a college student population. Convenience samples (n=485), of

which 84% were upperclassmen and nearly 50% were male, were recruited in classrooms at a California university of 23,000 students during the 1997 spring semester. Approximately 30% of respondents reported past use of herbal medicine. Nearly 26% reported use of massage and chiropractic, respectively, while fewer used meditation (9.3%), acupuncture (4.3%), and hypnosis (3.7%). Users tended to perceive CAM therapies as more beneficial compared to non-users of CAM. For seven of the eight therapies studied, recommendation by family or friend was the most frequently reported reason for seeking CAM care. While the frequencies were somewhat informative, no other statistical analyses were used and the generalizability is highly limited with the use of convenience sampling, an extreme bias toward upperclassmen, and inclusion of students only at one school. In addition to these limitations, a more major concern is the omission of a definition for "use." Without a specified operationalization, it is not known whether use is ever, in the lifetime, within the past 12 months, single or repeated, or any number of other possibilities.

Owens, Taylor, & DeGood (1999) compared two hospital out-patient groups and a community group in Virginia regarding predictors of CAM use (n=186). Absorption, positive affect, and education were found as significant predictors. Absorption is related to a person's ability to produce physiological changes in his or her body by purposely changing his or her state of consciousness, i.e., relaxing the mind. It would follow that people with high absorption would benefit more from mind-body therapies involved in CAM and, therefore, be more likely to choose those therapies. Women scored significantly higher than men on the absorption scale in this study and previous research cited by Owens et al. This is consistent with demographic findings of CAM use studies

demonstrating women use CAM more. In addition to absorption, people who reported higher positive affect, or feelings, toward CAM also rated effectiveness of CAM higher.

In 1999, Siahpush conducted another study of a larger Australian adult sample (n=787). Systematically randomized telephone interviews were conducted to build upon his previous work regarding attitudes toward CAM and verify whether dissatisfaction with medical care does indeed contain the two components: the outcome and the encounter. Education was the only significant demographic variable related to attitudes. From the findings, Siahpush concluded "The main reason people favor alternative medicine is their health-related values and beliefs" (p. 266). Those who are committed to environmental, feministic, spiritual, and personal growth beliefs are often CAM users. Siahpush (1999) found users to share beliefs that support natural remedies, holistic health, consumerism, and individual responsibility. After OLS regression, postmodern values accounted for 23% of the variation while neither component of dissatisfaction with conventional health care was shown to be a statistically significant determinant of attitudes toward CAM. While the study did not focus on actual use, Siahpush suggests findings regarding attitudes were similar to those of Astin (1998) who demonstrated beliefs/attitudes do impact actual behavior in relation to CAM use. Limitations for Siahpush's study include low reliability on some of the scales and use of telephone surveys which limits full representativeness of the sample.

Furnham (2000) recruited a representative adult sample of people living in England (response rate 95%) and a convenience sample from subject panels at a local university (response rate 92%). A paper survey of the 430 participants ranging in age from 17 to 79 gathered data regarding beliefs about CAM and attitudes toward

homeopathy. Perceived effectiveness of CAM therapies was related to the familiarity of participants with each of the therapies. Previous experience and interest in CAM was directly linked to attitudes toward homeopathy - the more therapies a participant had tried, the less against and the more in favor of homeopathy they were. Even for people who had not used many CAM therapies, simply having heard of them reduced their negative feelings toward homeopathy.

Oldendick, Coker, Wieland, Raymond, Probst, Schell, & Stoskopf (2000) conducted a state-level investigation of CAM use in South Carolina. Involving a highly black, rural, and low-income population, the phone survey of 1,548 adults demonstrated findings similar to other studies showing age and education as significant predictors of CAM use. Age was most significant for lifetime use while education was most significant for use in the past year. Over half of the respondents reported using a CAM therapy at least once in their lifetime and 44% had used at least one in the past year. Over 25% reported repeated use over the lifetime of personal and relaxation therapies, respectively. People significantly more likely to use CAM were women, middle-aged and older, and divorced or separated individuals. Sixty percent believed CAM was effective and 47% reported maintenance of health as the number one reason for using CAM. Almost 88% would recommend CAM and the primary sources of CAM information were physician (20%), spouse or relative (20%), magazines (16.4%), and friend or neighbor (9.2%). One-third of respondents indicated they would be more likely to try a CAM therapy if it were recommended by a physician. Recall bias is an issue with self-report and findings for this study can not be generalized to men, to the general U.S. population, or to members of

households without telephones. The validity of a question regarding future intentions (i.e., the likelihood of trying a therapy in the future) should be assessed with caution.

Conner, Kirk, Cade, & Barrett (2001) used the Theory of Planned Behavior to explore dietary supplement use among women in the United Kingdom. Four hundred women, a stratified sample of a concurrent larger study, were asked to complete a survey and maintain a food diary. Sixty percent of respondents reported using dietary supplements. Supplement users varied significantly from non-users as having stronger intentions to use, more positive attitudes, more perceived normative pressure, and more perceived behavioral control. Users demonstrated more positive outcome evaluations, i.e., they placed more importance on the perceived outcomes of taking supplements. Users reported positive outcomes of supplement use such as increased health, illness prevention, lack of harm, and doing the best for themselves. Such positive outcome evaluations combined with higher rates of perceived control were the norm for users while lower scores on both constructs were reported for non-users.

Users and non-users also varied on perceived normative pressures. Users perceived family, friends, health care providers, and media as promoting use and were motivated to comply with this perceived social pressure. To the contrary, non-users perceived these social influences as promoting non-use. The sample in this study was not representative of the general population as was, most likely, to be interested in health due to its association with a health-focused organization. Dietary supplements were the only CAM therapy assessed and while there are high rates of reported use, use was not defined as one time, intermittent, or consistent use, making comparability of findings a challenge.

Eisenberg, Kessler, Van Rompay, Kaptchuk, Wilkey, Appel, & Davis (2001) looked at perceptions about CAM and conventional medicine among CAM users. The majority of 831 people who had seen both a conventional and CAM practitioner in the past year did not believe CAM providers were better listeners or providers of information than conventional care providers, though approximately 50% of believed CAM practitioners devoted more time to them. Among 411 respondents who had visited a conventional practitioner and used any CAM therapy (including self-treatments, but not prayer) in the past year, about 80% disagreed that CAM was better than conventional therapies. That same proportion believed treating their conditions with a combination of CAM and conventional services was the best approach rather than choosing one form of care over the other. This makes sense in the light of the numbers of people in national surveys using both forms of care and the preference of postmodern consumers who prefer choice and participation maintaining their health. Limitations of this study are the same as indicated in the national studies section: sampling restrictions, fairly low response rate, and self-report/recall bias issues.

Newberry, Berman, Duncan, McGuire, & Hillers (2001) assessed use of nonvitamin, nonmineral dietary supplements (NVNM) among undergraduates at Washington State University as well as demographics, health beliefs (perceived health benefits and perceived efficacy), and lifestyle practices of CAM users. Using Dillman's (2000) tailored design method (TDM), 500 surveys were sent out to collect data on use of 22 herbal dietary supplements and 13 non-herbal supplements used by respondents in the past 12 months. A response rate of 54.4% provided 272 completed surveys (58% female, 42% male) of which almost half (48.5%) of reported use of NVNM use in the past year.

NVNM users were discovered to be most likely in a health-related profession ($p<.05$). The main reason reported for NVNM use was promotion of health and prevention of illness and 77.8% of respondents reported the NVNM to be effective. No significant differences were found for race or gender; however, differences were found in the types of NVNM used by males and females. NVNM used by females are primarily used for weight loss, depression, and anxiety, while those used by males are typically used for enhancing athletic performance. Promotion of health might have a different meaning for at least some college students leading them to risky behaviors all under the guise of health. Of the 14% of respondents who experienced illness or side effects due to NVNM use, most ignored the symptoms and continued to use them. Potential eating disorders were a concern as individuals, with body weights considered healthy according to national standards, reported using weight loss supplements. Rates of NVNM use among this population were higher than that of the general population, which could be due to more exposure to marketing efforts and willingness to take risks with their bodies.

Martin, Jordan, Vassar, & White (2002) surveyed adults in Toledo, Ohio, to measure supplement use and characteristics of supplement users. Participants were recruited from three grocery store parking lots in Toledo over a six-month period. Respondents were asked to report use and beliefs regarding five CAM categories. Ninety-five percent reported using at least one CAM therapy in the past year with 40% reporting use of herbal therapy in that time frame. Herbal users believe herbals are effective (86%) and have fewer negative effects than pharmaceuticals (22%). Magazines, health food stores, and friends were the main sources of information regarding herbal supplements. While stringent measures were taken to ensure a valid and reliable instrument and to

prevent selection bias, the convenience sample was highly biased toward people who were white (73%), women (72%), over age 35 (75%), with at least one year of college education (66%), and who have insurance (69%) and a primary care physician (87%). Such a sample is congruent with the high (95%) rate of CAM use in the past year. With such little variation in the sample, it is not surprising demographics were not found to be significant predictors of use.

Rafferty, McGee, Miller, & Reyes (2002) used a supplement to the Behavioral Risk Factor Surveillance System (BRFSS) to assess CAM use in Michigan. This was the first state assessment involving both genders and the first time the BRFSS was used to assess CAM use. The population-based telephone survey involved 3,764 adults of which nearly two-thirds were women. Nearly 50% of respondents had used at least one of the 11 included CAM therapies in the past year. Herbal supplement use was reported by 20.5% of respondents and CAM use was significantly higher among women, whites, people with higher education, and people with poorer health status. Reasons for use included promotion of overall health (42.5%), treatment of disease or condition (24.4%), and prevention of disease or condition (6.8%). A vast majority (83.2%) of CAM users believed all CAM therapies are helpful. Findings from this survey, as with similar surveys, are hampered by self-report, estimation, and recall bias as well as coverage and non-response errors.

Wilson & Klein (2002) examined use of 16 CAM therapies among adolescents, ages 14-19, in Monroe County, New York. The telephone survey achieved a 58% response rate and attained a final sample of 361 (137 males, 224 females). Fifty-four percent of the youth participants had used CAM in the past six months. Highest rates of

use were reported for massage (13.2%), prayer/faith healing (13.1%), herbal remedies (11.5%), megadose vitamins (10.6%), special exercises (10.1%), and natural performance enhancers (7.9%). Among these six therapies, massage was the only practitioner-based therapy, while three of them were related to ingestion of a product. Herbs, special diets, and exercises were favored by females while males were more likely to use performance-enhancing supplements. Adolescents reporting smoking or alcohol experience were more likely to have used CAM. Participation in school clubs, CAM use by parents or friends, seeking of confidential care, and perceived efficacy of treatments were significantly associated with CAM use. Friend use was more significant as a predictor than parent use. Respondents believed CAM was expensive, but accessible, natural, and effective. Non-white participants did not believe their culture, family, and related healing traditions were understood by physicians and over 40% believed it was appropriate to participate in health care practices without physician recommendation. The findings of this study are useful for understanding the influence of an adolescent's social network upon CAM use. Results are not generalizable outside Monroe County or to adolescents in specific cultural or ethnic groups. Researchers used a broad definition of CAM and members of different cultural backgrounds could have interpreted therapies differently. The sample was biased toward females and limited to households with telephones. Self-report and recall bias among this adolescent population are also a concern.

Chng, Neill, & Fogle (2003) conducted a convenience paper survey of 913 students at the University of North Texas to assess CAM use. The sample included 328 males to 585 females and 683 undergraduates to 230 graduates ranging in age from 18 to 62. They included seven therapies and use was defined as use within the past year.

Independent variables included gender, class level, CAM use, attitudes toward CAM, and multidimensional locus of control. Dependent variables were CAM use, attitudes, and locus of control. Significant predictors of CAM use were holistic attitude and control. CAM users demonstrated a more internal locus of control regarding health. Dissatisfaction with or negativity toward conventional medicine was not a significant predictor of CAM use in this study. Participants reported CAM and conventional practitioners should work together. Overall, 66% of participants reported use of at least one of the seven therapies in the past year. Forty-three percent of respondents reported use of high-dose vitamins/nutritional supplements as well as use of herbal medicine (42%), relaxation/meditation (42%), massage therapy (35%), chiropractic (18%), yoga (12%), and acupuncture (5%). Graduate students and females were more likely to be CAM users. Female participants reported higher rates of massage, yoga, and high-dose vitamins.

O'Callaghan & Jordan (2003) built upon previous research of Siahpush (1999) to test postmodern variables and predictors of attitudes and behavior related to CAM use. They surveyed a convenience sample of 171 university and community volunteers, ages 16 to 65, in Australia regarding three CAM therapies. In Australia, they used Siahpush's 4-pt Likert-type scales in a paper questionnaire administered to a large group of people while the researcher was in the room. Of the 36.3% who identified themselves as CAM users, 77% were female. Actual behavior was measured via self-reported visits to an acupuncturist, aromatherapist, naturopath, and medical. Two significant sub-scales of the postmodern variable, preference for natural remedies and rejection of authority, accounted for 51% of the variance in the hierarchical multiple regression analysis. While

age was not a significant predictor of use, it was a significant predictor of attitudes toward CAM. More positive attitudes toward CAM were found most often in younger people and individuals with postmodern beliefs regarding health. Limitations of this study include the overrepresentation of females and people with higher education attainment, use of convenience sample, and the inability of the postmodern scales to account for all variance in attitudes toward CAM and CAM use. These limitations result in a possible inflation of results regarding use, low generalizability, and an incomplete explanation of CAM use and attitudes, respectively.

Sharma, Haas, and Stano (2003) gathered data from December 1994 to June 1996 from two cohorts (n=1414 and 1598) in a study exploring significant determinants of choosing a health care provider. Participants were adults 18 years or older in the state of Washington whose main complaint was low blood pressure. People were more likely to choose a chiropractor if they opposed prescription drugs, believed in the provider's ability to treat the condition, reported favorable attitudes toward self-directed and self-involving care, were older, earned higher income, and were responsible for payment. People more likely to choose a medical doctor are more likely to believe medical doctors and chiropractors are equally skilled and expect their care to be paid by a third party payer (e.g., insurance company). Trust was significant among those who would choose either kind of provider. Sharma et al. concluded "Patients who choose chiropractic as opposed to medical treatment require higher expectations of relief from treatment" (p. 2115). They also concluded patient attitudes are important in choosing a health care provider.

From their national study involving over 30,000 respondents, Barnes et al. (2004) gathered data on potential reasons why people use CAM. Extensive in-person interviews

regarding 27 CAM therapies and prayer for health resulted in a 74.3% response rate. Higher use was reported among women and older adults with higher education. The study also provided a host of significant findings which were dependent upon inclusion or exclusion of megavitamins and/or prayer for health reasons as CAM therapies. Over half of users believed combined use of CAM and conventional therapies would improve their health and that CAM would be interesting to try. About a quarter reported failure of conventional medicine to help them and referral from a medical professional as reasons for CAM use. Thirteen percent believed CAM was more cost-effective than conventional medicine. Self-reported responses are limited by recall abilities, knowledge of the CAM therapies included in the study, and willingness and/or ability to respond accurately during an in-person interview.

Feldman & Hergenroeder (2004) studied folk and traditional medicine use among Mexican and Mexican-American teens in the American southwest. The cross-sectional study involved 11-14 year olds (n=182) participating in church or community-based youth groups in the first half of 2003. Almost 27% of the respondents had used CAM in the past year of which 100% was prompted by illness. Three significant predictors of use were (1) lack of satisfaction with prior care, (2) attending most recent medical visit alone, and (3) family use of herbs and/or healers. Participants who reported any of those three predictors were, respectively, 7.1, 4.4, and 8.4 times more likely to use folk and traditional medicine than their peers who did not share the same sentiments.

Huang & Slap (2004) analyzed data from the Household Component of the 1998 MEPS regarding CAM use in adolescents ages 11-21. Data were provided primarily by parents of 4227 adolescents in 2705 households via telephone interviews. Significant

differences were found among gender, race, and insurance with more females, whites, and holders of private insurance more likely to be CAM users. CAM use in this population was definitely influenced by their parents with highest CAM use among adolescents whose parents were CAM users. ($p<.001$) and whose parents had more education and more money. Following national data trends, those who lived in the West reported higher CAM use. Spiritual 32.3%, herbal (17.3%), and massage therapy (13.3%) were the most reported therapies used.

Summary of Studies Regarding Predictors of CAM Use

The studies in this section addressed social and psychological predictors of CAM use among a variety of populations. Studies included seven telephone surveys, two mail surveys, a secondary analysis, seven paper surveys, two interview surveys, and four studies which combined paper surveys with interviews, food diaries, or observations. All studies were conducted in primarily English-speaking countries with one in Canada, three in Australia, five in the United Kingdom, and 14 in the United States. Sample sizes ranged from 38 to 31,044 participants. Studies were conducted among nationally representative samples, as well as less rigorous random samples, and a fair share of convenience samples. Studies involved four populations: adults, adolescents, women, and college students.

With vastly different methods among vastly different populations, a similarity linking these studies was their intent to assess determinants or predictors of CAM use. The literature suggested several categories of CAM use predictors which have been studied in previous research and upon which further research could be founded.

Information regarding characteristics of users, reasons for choosing CAM, attitudes toward doctor-patient relationships, beliefs of CAM users, and influence of social network upon CAM use were extracted from applicable studies. Following is a synopsis of what was found in the reviewed studies within each of these categories.

Characteristics of Users

Demographic patterns of CAM users in these studies were almost identical to those in the national studies involving rates of use. While one study found demographics not significantly associated with CAM use (Martin et al., 2002), most studies found CAM users are more likely to be female (Barnes et al., 2004; Chng et al., 2003; Huang & Slap, 2004; Kelner & Wellman, 1997a & b; Oldendick et al., 2000; Newberry et al., 2001; O'Callaghan & Jordan, 2003; Rafferty et al., 2002), white (Huang & Slap, 2004; Newberry et al., 2001; Oldendick et al., 2000; Rafferty et al., 2002), divorced or separated (Oldendick et al., 2000), and living in the western part of the United States (Huang & Slap, 2004). Three studies showed CAM use was significantly higher among middle aged and older people (Barnes et al., 2004; Oldendick et al., 2000; Sharma et al., 2003) while one study suggested the opposite (Kelner & Wellman, 1997a & b).

Education was a significant predictor of CAM use in several studies. Six studies showed increased CAM use was associated with higher educational attainment (Astin 1998; Barnes et al., 2004; Kelner & Wellman, 1997a & b; Oldendick et al., 2000; Owens, Taylor, & DeGood, 1999; Rafferty et al., 2002). While CAM use was significantly lower for persons whose parents did not graduate from high school (Huang & Slap, 2004), college students demonstrated higher CAM use than the general population (Chng et al.,

2003), and graduate students were more likely to use CAM than undergraduates (Chng et al., 2003). Education might be related to the reason CAM users are more likely, and/or more able, to seek out information regarding CAM (Furnham, 2000). People with higher levels of education tend to have higher paying jobs. Previous studies suggest CAM use is greater among people with higher incomes (Huang & Slap, 2004; Kelner & Wellman, 1997a & b) and people with higher level occupations (Kelner & Wellman, 1997a & b) or in health-related professions (Newberry et al., 2001). One study suggested CAM users are more likely responsible for payment (Sharma et al., 2003) while another showed CAM users were more likely to have private insurance (Huang & Slap, 2004).

In addition to demographics, CAM users tend to have other similar characteristics. They report themselves as being more health conscious (Conner et al., 2001; Furnham & Forey, 1994) and rate themselves as more proactive in health-promoting behaviors such as:

- exercise (Kelner & Wellman, 1997a & b),
- diet (Kelner & Wellman, 1997a & b),
- vegetarianism (Furnham & Forey, 1994), and
- vitamin use (Kelner & Wellman, 1997a & b; Newberry et al., 2001).

Even as CAM users often report poorer health status (Rafferty et al., 2002) and chronic illness (Astin, 1998; Kelner & Wellman, 1997a & b), they demonstrate less disability (Sharma et al., 2003) and report higher rates of perceived health and well-being than non-CAM users (Kelner & Wellman, 1997a & b; Owens, Taylor, & DeGood, 1999). Adult CAM users are less likely to be smokers (Sharma et al., 2003) while, in contrast, adolescents who had smoked or used alcohol were more likely to have used a CAM

therapy (Wilson & Klein, 2002). Adolescent CAM users also were more likely to be involved in extracurricular activities (Wilson & Klein, 2002).

CAM users also share a host of characteristics considered to be postmodern values. These include a holistic view of health (Astin, 1998) and a transformational experience that changed their worldview (Astin, 1998). CAM users consider themselves to be cultural creatives (Astin, 1998) and unconventional (McGregor & Peay, 1996). They consider spirituality, not necessarily religion, important (Kelner & Wellman, 1997a & b) and demonstrate greater scores on absorption, the ability to induce a relaxation response (Owens, Taylor, & DeGood, 1999).

Reasons for Choosing CAM

People choose CAM therapies for many different reasons. While some people use CAM as an alternative to conventional medicine, the majority use both CAM & conventional (Astin, 1998; Eisenberg et al., 2001). They do not believe CAM therapies are superior to conventional treatment, but they do believe a combination is the best approach (Barnes et al., 2004; Eisenberg et al., 2001) and that CAM and conventional practitioners should work together (Chng et al., 2003). As with conventional care, people use CAM to treat an illnesses, diseases, and conditions (Feldmann & Hergenroeder, 2004; Rafferty et al. et al., 2002) and their decision to use CAM often depends upon the type of illness with which they are dealing (Eisenberg et al., 2001; Sharma et al., 2003). While CAM users reported maintenance of health (Oldendick et al., 2000) and the prevention of illness as reasons for using CAM (Conner et al., 2001; Newberry et al., 2001; Rafferty et al., 2002), the promotion of health was the most often reported (Astin,

1998; Conner et al., 2001; Newberry et al., 2001; Martin et al., 2002; Rafferty et al. et al., 2002). In comparison to the general population, Newberry et al. (2001) concluded college students use CAM, specifically NVNM, for different reasons than older adults. In addition to reasons listed above, participants in that study also reported weight loss promotion, increased energy, and enhanced athletic performance as reasons for NVNM use.

In addition to health and illness-related factors, issues with cost, convenience, and awareness can play a role in affecting a person's decision to use CAM. Furnham (2000) reported familiarity increases the likelihood of use because the most well-known therapies, such as chiropractic, are also the most used. CAM therapies have a mysterious quality about them and people report using a CAM therapy simply because the believed it interesting to try (Barnes et al., 2004). Convenience (Kelner & Wellman, 1997a & b) and cheaper cost (Barnes et al., 2004; Furnham, 2000) of CAM therapies were reported as reasons for use. While adults believed conventional care costs too much (Barnes et al., 2004) and that CAM costs less (Furnham, 2000), half of the adolescent participants in one study believed CAM was expensive (Wilson & Klein, 2002)

To understand why CAM is preferred or used by an increasing number of people, studies have examined the conventional, or medical, experience. Two avenues of the medical experience have been studied the most: the medical outcome and the medical encounter. Some studies demonstrate bad experiences, negative attitudes, and dissatisfaction with conventional medicine were not significant predictors of CAM use (Astin, 1998; Chng et al., 2003; McGregor & Peay, 1996). Among youth, however, dissatisfaction with prior care was found to be a significant predictor (Feldmann &

Hergenroeder, 2004). In other studies, failure of conventional medicine (Finnigan, 1991), lower efficacy regarding general conventional care (Barnes et al., 2004; McGregor & Peay, 1996), less satisfaction with conventional outcomes (McGregor & Peay, 1996), and desperation (Kelner & Wellman, 1997a & b) were reported by participants as playing a role in their decision to use CAM. CAM users tend to be more skeptical of conventional care (Furnham & Forey, 1994) and often refuse conventional treatment (Finnigan, 1991). This fits with McGregor & Peay's (1996) suggestion that people choose CAM due to an overall negative opinion with conventional care.

According to Siahpush's (1998) findings, positive attitudes toward CAM are affected by dissatisfaction with the medical encounter but not the medical outcome. The medical encounter is referring to the doctor-patient relationship. In Eisenberg et al.'s (2001) study, users of both CAM and conventional care reported similar confidence in CAM and conventional care providers. In this same study, about half of the participants did not believe CAM providers devoted more time to the patient, provided more quality of explanations, and had better listening skills than a conventional provider (Eisenberg et al., 2001). Findings from the other studies disagree. Distrust of conventional caregivers (Astin, 1998), dissatisfaction with conventional practitioners (Astin, 1998; Kelner & Wellman, 1997a & b), and lack of listening by conventional practitioners (Furnham & Forey, 1994) were reported among several studies.

Among adolescents in minority groups, the concerns are even greater. Minority adolescents feel their cultural healing traditions not understood by conventional physicians (Wilson & Klein, 2002) which might prevent them from having a supportive relationship with that type of care provider. In fact, the Mexican-American adolescents

who attended most recent medical visit alone were significantly more likely to use CAM (Feldmann & Hergenroeder, 2004). This suggests the adolescents had a very negative experience and chose not to return to that caregiver. As a parent did not attend the visit with them, it also seems they are more responsible for their health care and, therefore, are more likely to choose therapies and caregivers to which they can relate culturally.

Overall, CAM practitioners are chosen for many reasons, including reputation (Kelner & Wellman, 1997a & b). CAM users demonstrate greater trust in (Sharma et al., 2003) and report higher efficacy of (Astin, 1998; Furnham & Forey, 1994; Sharma et al., 2003) abilities of CAM practitioners. CAM practitioners are preferred over conventional practitioners for these reasons:

1) more friendly/personal (Finnigan, 1991)
2) more of a partnership (Finnigan, 1991)
3) given more time (Finnigan, 1991; Furnham, 2000; Eisenberg et al., 2001)
4) holistic approach (Finnigan, 1991; Furnham, 2000)
5) understood illness better (Finnigan, 1991)
6) atmosphere more friendly, relaxed (Finnigan, 1991)
7) therapeutic efficacy (Finnigan, 1991)
8) more understandable and useful explanations (Eisenberg et al., 2001)
9) better listeners (Eisenberg et al., 2001)

College students communicated a trust in CAM providers and reported they were not concerned about the safety of CAM or credibility of CAM practitioners (Chng et al., 2003). They also did not believe CAM practitioners are quacks or frauds (Chng et al., 2003).

Along with many positive qualities of CAM practitioners, the patient role in health care and health decisions has been shown to be an important factor in using CAM. CAM users favor personal involvement, choice, and self-directed treatment (Sharma et al., 2003). Thirty-eight percent of CAM users believe themselves to be the most helpful person in making health care choices compared to 15% of general practitioner users (Kelner & Wellman, 1997a & b). In contrast, 70% of general practitioner users think doctors are the best help in making health care choices (Kelner & Wellman, 1997a & b). CAM users seem less willing to give control over to a physician. Studies report CAM users have a desire for control (Astin, 1998), a greater internal locus of control (Chng et al., 2003; Finnigan, 1991; Furnham & Forey, 1994), and more perceived behavioral control (Conner et al., 2001). Overall, this means CAM users have a strong belief in their ability to influence own health (McGregor & Peay, 1996) and are favorable toward active behavioral involvement, or changing their behaviors, to impact their health (Sharma et al., 2003). In Chng et al.'s (2003) study, internal locus of control significantly correlated with a holistic attitude toward health and was a significant predictor of CAM use.

A holistic attitude influences the perceived outcomes and benefits of CAM. CAM users find holistic care more satisfying than conventional care (Furnham, 2000) and demonstrate higher perceived efficacy of CAM therapies to relieve symptoms and to help them feel better (Astin, 1998; Furnham, 2000; Furnham & Forey, 1994; Martin et al., 2002; Oldendick et al., 2000; Rafferty et al., 2002; Wilson & Klein, 2002). They believe CAM treatments work better than conventional treatment for their particular condition (Astin, 1998) and believe CAM to be efficient (Furnham, 2000), natural (Martin et al., 2002; Wilson & Klein, 2002), accessible (Wilson & Klein, 2002), and less harmful due to

fewer side effects (Conner et al., 2001; Furnham, 2000; Martin et al., 2002). Conner et al. (2001) found perception to play a major role in determining CAM use. CAM users perceived positive outcomes of CAM while non-users perceived negative outcomes (Conner et al., 2001). In Newberry et al.'s (2001) study regarding NVNM use among college students, NVNM users reported significantly higher scores regarding the outcomes of supplement use. They believed very strongly that NVNM supplements would help them be healthy, stop them from getting ill, not do them any harm, be the best they can do for themselves (Conner et al., 2001). Unfortunately, college students continued use of supplements even after they experienced harm in the form of bad side effects (Newberry et al., 2001). It seems their perceived outcome evaluations, or perceived benefits, outweighed the reality of the situation in determining continued use.

The reviewed studies paint an overall picture of CAM users. CAM users believe in CAM philosophies and principles (Finnigan, 1991, Kelner & Wellman, 1997a & b), believe treatments should concentrate on the whole person instead of just symptoms ($p<.001$) (Furnham & Forey, 1994), and believe CAM is not only for ill people ($p<.001$) (Furnham & Forey, 1994). CAM users have often had a positive experience with CAM (Kelner & Wellman, 1997a & b; Oldendick et al., 2000) and perceive therapies as more beneficial (Gaedeke et al., 1999; Siahpush, 1998). While non-users are less interested, more skeptical, and more ignorant of CAM (Furnham, 2000), CAM users, especially younger people (O'Callaghan & Jordan, 2003; Conner et al., 2001), have more positive attitudes (Conner et al., 2001; Furnham, 2000) which translate into greater enthusiasm and stronger intention to use CAM therapies. CAM users tend to believe in the value of inner life and experiences (Astin, 1998) and do not like prescription drugs (Sharma et al.,

2003). Other postmodern values, such as rejection of authority and belief in natural remedies, were shown to be significant predictors of CAM use (O'Callaghan & Jordan, 2003)

Postmodern variables are also predictors of attitudes toward CAM. Siahpush (1998, 1999) found faith in natural remedies, a holistic view of health, consumerism, and individual responsibility are correlated to more positive attitudes toward CAM. He also reported attitudes were affected by dissatisfaction with medical encounter but not medical outcome (Siahpush, 1998, 1999). Medical outcomes were more important to men, more educated, and older individuals (Siahpush, 1999). O'Callaghan & Jordan (2003) found rejection of authority and belief in natural remedies were significant predictors of attitudes toward CAM. Age (O'Callaghan & Jordan, 2003) and education were two demographic variables significantly related to attitude toward CAM (Siahpush, 1999) Attitudes toward CAM also are affected by experience and interest in CAM - the more therapies used the better the attitudes (Furnham, 2000)

A person's social network also can influence their use or non-use of CAM. The experience of others seems to increase the likelihood of CAM use (Finnigan, 1991; Kelner & Wellman, 1997a & b) as CAM users were significantly more likely to know someone who uses CAM (Furnham & Forey, 1994) or know someone who has received effective treatment (Furnham & Forey, 1994; Kelner & Wellman, 1997a & b). CAM users have higher perceived normative pressures to use CAM, which means users perceive pressure to use CAM from all members of their social network and have high motivation to comply with this perceived pressure (Conner et al., 2001). In contrast, non-users perceive their social network as expressing pressure to not use CAM. Issues

regarding perceived need vs. actual need can be a problem when people are easily influenced by their social network (Conner et al., 2001). People using any health care for based upon perceived pressures versus actual need can be harmful, expensive, and taxing upon the health care system.

Many social network members were reported to influence a person's decision to use CAM. Friends were often reported as the number one influence in many of the studies assessing social network and CAM use (Conner et al., 2001; Finnigan, 1991; Gaedeke et al., 1999; Kelner & Wellman, 1997a & b; Martin et al., 2002; Newberry et al., 2001; Oldendick et al., 2000; Wilson & Klein, 2002). In addition to friends, other social influences included:

1) Conventional doctor (Barnes et al., 2004; Conner et al., 2001; Finnigan, 1991; Gaedeke et al., 1999; Kelner & Wellman, 1997 a & b; Oldendick et al., 2000);
2) CAM provider (Conner et al., 2001; Kelner & Wellman, 1997a & b; Oldendick et al., 2000;);
3) Parents (Feldmann & Hergenroeder, 2004; Huang & Slap, 2004; Wilson & Klein, 2002);
4) Relatives/family/spouse (Conner et al., 2001; Finnigan, 1991; Gaedeke et al., 1999; Kelner & Wellman, 1997a & b; Newberry et al., 2001; Oldendick et al., 2000);
5) Acquaintances (Kelner & Wellman, 1997a & b);
6) Coworkers (Kelner & Wellman, 1997a & b);
7) Media (magazines, television, books, newspapers, stores) (Conner et al., 2001; Oldendick et al., 2000; Martin et al., 2002; Newberry et al., 2001).

For college students using NVNM supplements, sources of information included retail stores, friends, family, coaches, media, healthcare professionals, and other (Newberry et al, 2001). One study showed 15% of respondents treat children with herbals (Martin et al., 2002) and such early use in life is likely to lead to adult use.

Critical Analysis of Studies Regarding Predictors of CAM Use

The studies reviewed have many limitations. Many of the studies involved small sample sizes and convenience sampling which limits the reliability of data and the generalizability of findings to other settings. Studies recruited participants from health care centers, college classrooms, existing organization memberships, and grocery store parking lots. Response rates measured 48% and higher. Only a handful of the studies involved random sampling which increases the generalizability of findings to a broader population, however, these studies still faced some limitations including self-selection bias and coverage error. All of the studies except one involved only English-speaking participants and many of the studies were heavily biased towards women, people with higher education, and those living in households with telephones. Underrepresentation of less-affluent, less educated populations can inflate results (Astin, 1998). For example, Conner et al.'s (2001) sample was part of an existing UK Women's Cohort Study. This sample is not representative of the general population as participants seem more likely to be interested in health due to their association with the health-focused organization.

Studies were all based upon self-report which questions the accuracy of responses due to recall bias and the willingness of the participant to answer truthfully. Participants might have felt influenced by the researcher or by the nature of the study to respond with

answers they consider favorable to the interviewer or survey administrator. None of the studies were anonymous. In fact, one study (McGregor & Peay, 1996) promised anonymity and confidentiality to its participants. Researchers should have known a study can be either anonymous or confidential, but not both. Use of a financial incentive by Eisenberg et al. (2001) also may have influenced the type of people who participated.

The qualitative nature of several of the studies creates a unique set of limitations. Staunch supporters of the "hard" sciences would question whether this was actually real research. Those involved in behavioral research believe it has a different set of theoretical underpinnings. Qualitative research, such as the interviews and journal used in some of the reviewed studies, allow a researcher to capture more in-depth data. Open-ended questions and room for personal reflection allow a researcher access to data which would not be apparent with multiple choice or dichotomous questions. This also allows the researcher to gain new insight into variables he or she might not have considered before. However, the presence and direct interaction of an investigator might also reduce the comfort level of participants to provide accurate information.

Some limitations exist with the data collection and analyses involved in the reviewed studies. For example, Siahpush's (1998, 1999) instrument focused on attitudes, not use, and included scales which generated data with low reliability. Gaedeke et al. (1999) only reported frequencies, which are not useful for providing any predictive power. When variables do not account for all variance in the multiple regression equation (Astin, 1998; O'Callaghan & Jordan, 2003), prediction was difficult or compromised.

While the ever-evolving definition of CAM is an issue in all CAM research, in several studies reviewed here, CAM "use" was not defined which makes it impossible to

compare to other studies. Gaedeke et al. (1999) did not provide a definition of use and Conner et al. (2001) did not identify if use was intermittent or consistent. Another problem with these studies is the vast amount of variance in the number of CAM therapies included in the definition of CAM. Some studies did not identify any specific CAM therapies, one study involved 27 therapies plus prayer for health reasons, and other studies were anywhere in between with each using their own unique CAM categories.

Of the three studies involving college students, two took place on the West Coast and one took place in Texas. Two studies involved convenience samples and the other involved random selection of undergraduate students. All three involved paper surveys: one mail with telephone follow-up and two distributed in classrooms and other campus locations. A comparison of the three studies is found in Figure 5. The studies are limited in their generalizability as their findings can only be generalized to their single school. The generalizability is also compromised in two of the studies as they employed convenience sampling to recruit participants. All three involve paper instruments which are more costly and time-consuming than newer, technology-based methods. The number of therapies included in each is very small, especially compared to Barnes et al.'s (2004) recent national study involving over 27 different therapies.

Figure 5. Comparison of CAM studies involving college students.

	GAEDEKE, TOOTELIAN, & HOLST (1999)	NEWBERRY, BERMAN, DUNCAN, MCGUIRE, & HILLERS (2001)	CHNG, NEILL, & FOGLE (2003)
Location	California	Washington	Texas
Population	Undergraduates	Undergraduates	Undergraduates & Graduates
Sample Selection	Stratified Convenience	Random	Convenience
Sample Size	485	272	913
Males:Females	224:249 (51% female)	114:158 (58% female)	328:585 (64% female)
Instrumentation	Paper Survey	Paper Survey/Phone Follow-up	Paper Survey
Method	Distributed in Class	Mailed	Distributed in Class/Campus
# CAM Therapies	8	1	7
Focus	Familiarity, use, perceptions	Nonvitamin, nonmineral supplement use	Use, attitudes, locus of control

Need for Research

The intention of the present study was to fill a gap in the literature. Prevalence of CAM use among the general population and adolescents has been reported, but few studies involving overall CAM use among college students have been published. The literature also indicated measuring rates of use was not enough. Researchers expressed the importance of understanding the reasons, especially psychosocial issues, which explain the decisions to use CAM (Cauffield, 2000; Eisenberg et al., 2001). Upon completion of their study of NVNM use among college students, Newberry et al. (2001) commented, "Further research should use a theoretical behavioral model that can provide researchers and practitioners with a greater understanding of factors associated

with…use" (p. 128). Random, reliable, valid, theory-based research involving CAM use specifically in the college population is needed.

CAM studies repeatedly demonstrated education or higher educational attainment as a highly, if not the most, significant predictor of CAM use (Astin, 1998). If so, college students are likely to be current or potential CAM users who are becoming increasingly responsible for their own health. In addition to demographics, researchers have begun to explore social and psychological influences of CAM use, but many theoretical constructs have yet to be examined and/or examined in greater detail among various populations. Due to continued increase in CAM use and the unique situation of college students, this study planned to explore theoretically-based constructs in relation to CAM use among college students. Social Cognitive Theory was selected for its applicability as a theoretical foundation for studying use and predictors of CAM use among the college population.

Summary

Chapter II reviewed two aspects of CAM literature: prevalence of use and predictors of use among adult populations. Each study had its own strengths and limitations. Only a few studies specifically addressed CAM use among college students and more research is needed to understand this population’s use of CAM. Chapter III presents the methods proposed to fill the gap in the literature regarding CAM use among undergraduate students.

CHAPTER III

METHODS

This study employed a web-based survey with an instrument designed to assess CAM use and use predictors among a sample of undergraduate students in the Texas A&M System campuses. Approval was gained by the Institutional Review Board (IRB) (Appendix D) at Texas A&M University and a pilot study was conducted to test the instrument. Reliability tests and factor analyses were conducted on the pilot and final data. Correlations examined relationships between variables and multiple regression analyses were used to determine significant predictors of CAM use among the sample.

Instrumentation

A systematic review of the literature was conducted to inform development of survey items. The web-based survey was put on-line using a purchased software program and accompanying database entitled SurveySelectASP Advanced version 8.0.2. It was reviewed by a voluntary panel of experts to ensure content validity (Appendix E) and recommended changes were made when appropriate. A pilot test of the survey was conducted with a convenience sample of 33 undergraduate students at Texas A&M University. Reliability, or internal consistency based upon Crohnbach's alpha scores, and factor analyses were conducted. Statistical analysis of the pilot test results informed amendments to the instrument and the amended survey was re-submitted to the IRB for approval.

The web-based survey was designed to gather several sections of information. The survey consisted of 25 questions gathering data on college and lifetime use of CAM treatments, supplements, diets, prayer, and exercise for health reasons. One scale was used to assess attitude toward CAM (Siahpush, 1999) and two scales were designed by the researcher to measure outcome expectancies and observational learning. Descriptions of the variables follow.

Research Variables

Dependent Variable

The dependent variable was use of CAM therapies. This variable considered use of CAM therapies since participants started college and use of those same CAM therapies at any point in the lives of the participants. This section collected use information on 33 types of CAM therapies. This section was based upon the 31 categories used by the 2002 National Health Interview Survey (NHIS) (Barnes et al., 2004) with two additional CAM types added. The South Beach Diet was added to reflect recent diet trends and exercise for health reasons was added as a behavioral influence upon health. Respondents were able to respond yes, no, or I don't know. Responses were coded (1=yes, 0=no or I don't know) to achieve an overall total score for use of CAM therapies. A score of zero meant the participant had not used any of the CAM therapies while a score of 33 meant the participant would have used each of the CAM therapies at least one time. Higher scores meant use of more CAM therapies.

Independent Variables

Outcome Expectancies

Outcome expectancies, observational learning, attitude toward CAM (Siahpush, 1999), and demographics were measured as independent variables. Outcome expectancies were scored using a 5-point Likert-type scale. Asked the question, "When you visit a health care provider, how important to you are each of the following outcomes?," participants used a 5-point rating scale to express how important they believed each of 14 outcomes to be. Higher scores indicate expectancy values more in line with CAM philosophy. Crohnbach's alpha showed an internal consistency for this scale of .86 (n=33) for the pilot study. A factor analysis of the pilot study data using varimax rotation showed three factors that explained 63.7% of the total variance (see Table 3). Because the pilot study had a small sample, all statements were kept to see how they would act within a larger sample.

Table 3. Pilot Study: Factor loadings for outcome expectancies.

		Factor 1	Factor 2	Factor 3
1	The health care provider seems to support my overall health.	**.871**	-.163	-.227
2	Following the advice of my health care provider will improve my situation.	**.776**	.199	-.367
3	The health care provider spends adequate time with me.	**.766**	-.340	-.354
4	I believe the health care provider will support me beyond my illness.	**.713**	.050	-.319
5	The health care provider respects my health care beliefs.	**.699**	-.085	.057
6	Risks associated with the treatment are minimal.	**.676**	.066	.283
7	Risks are explained to me in a clear and understandable way.	**.665**	-.169	.299
8	The visit is worth the monetary cost.	**.661**	-.568	-.018
9	I am less anxious about my health.	**.650**	.152	-.084
10	Helpful information is provided by the health care provider.	**.543**	-.099	.306
11	Concerns are effectively addressed by the health care provider.	.362	**.709**	.127
12	I experience immediate improvement in problems.	.574	**.625**	.061
13	The visit is worth the time spent planning it, getting to it, waiting for it, and having it.	.420	.423	.411
14	I experience increased relaxation.	.287	-.435	**.693**

The same factor analysis was repeated in the final study to determine if the data reacted the same way (Table 4). In the final study, this scale demonstrated a Crohnbach's alpha of .91 and the statements loaded on two factors that accounted for 56.1% of the total variance. Three of the 14 statements, regarding anxiety, information, and relaxation, generated ambiguous scores (<.5). Reliability was retested with these three items removed to see if the integrity of the alpha could be maintained while reducing ambiguity. With a reliability of .897 (n=345), it was determined these three items could be removed from the analysis. The factor analysis was rerun and the remaining statements loaded on the same two factors, which followed completely different patterns than the pilot study (Table 5). The factors now suggested eight statements relating to the treatment and provider while the remaining three were related to personal issues of concern, improvement, and time. Run separately, the internal consistency of the eight treatment/provider outcome expectancies statements was .898 and the three personal outcome expectancies statements was .714. A Pearson correlation between the two factors was .58 ($p<.000$) showing low collinearity. This meant the two factors were measuring different items and suggested they should be run as separate variables in the regression.

Table 4. Final study: Original factor loadings for outcome expectancies.

		Factor 1	Factor 2
1	The health care provider seems to support my overall health.	**0.809**	0.169
2	Following the advice of my health care provider will improve my situation.	**0.791**	0.225
3	The health care provider spends adequate time with me.	**0.786**	0.212
4	I believe the health care provider will support me beyond my illness.	**0.754**	0.268
5	The health care provider respects my health care beliefs.	**0.686**	0.199
6	Risks associated with the treatment are minimal.	**0.678**	0.326
7	Risks are explained to me in a clear and understandable way.	**0.666**	0.355
8	The visit is worth the monetary cost.	**0.640**	0.212
9	I am less anxious about my health.	**0.468***	0.442
10	Helpful information is provided by the health care provider.	**0.467***	0.466
11	Concerns are effectively addressed by the health care provider.	0.106	**0.806**
12	I experience immediate improvement in problems.	0.164	**0.801**
13	The visit is worth the time spent planning it, getting to it, waiting for it, and having it.	0.416	**0.612**
14	I experience increased relaxation.	0.422	**0.445***

* Indicates ambiguous scores of less than .5.

Table 5. Final study: Final factor loadings for outcome expectancies.

		Encounter Outcome Expectancies	Personal Outcome Expectancies
1	The health care provider seems to support my overall health.	**0.823**	--
2	Following the advice of my health care provider will improve my situation.	**0.823**	--
3	The health care provider spends adequate time with me.	**0.809**	--
4	I believe the health care provider will support me beyond my illness.	**0.808**	--
5	The health care provider respects my health care beliefs.	**0.710**	--
6	Risks associated with the treatment are minimal.	**0.758**	--
7	Risks are explained to me in a clear and understandable way.	**0.758**	--
8	The visit is worth the monetary cost.	**0.689**	--
9	Concerns are effectively addressed by the health care provider.	--	**0.825**
10	I experience immediate improvement in problems.	--	**0.812**
11	The visit is worth the time spent planning it, getting to it, waiting for it, and having it.	--	**0.764**

Attitude Toward CAM

Attitude toward CAM was measured using a scale designed by Siahpush (1999) in which participants were asked to rate their agreement with five statements on a 5-point Likert-type scale ranging from strongly agree to strongly disagree. Three items were reverse scored for analysis. Higher scores were designed to indicate more positive

attitudes toward CAM. Internal consistency was .90 (n=33) for the pilot study and .877 (n=345) for the final study. Factor analysis of the pilot study showed items loading on one factor and accounting for 72.1% of the variance. Final study loadings (Table 6) were similar with items loading on one factor and accounting for 67.8% of the variance.

Table 6. Final Study: Factor loadings for attitude toward CAM.

		Factor 1
1	I think most alternative therapists are quacks.*	**0.862**
2	I think most alternative therapies do not work.*	**0.839**
3	I would never use the therapies of an alternative therapist.*	**0.814**
4	I would recommend alternative medicine to any one of my friends who might get ill.	**0.812**
5	I trust most alternative therapists.	**0.790**

*Using reverse score.

Observational Learning

Observational learning was assessed by asking participants to indicate the people in their lives whom they believe to be CAM users. A higher score for observational learning means more groups of people in a participant's social network were known by the participant to be users of at least one CAM therapy. Internal consistency in the final study was .875 (n=338). All items loaded on one factor accounting for 61.7% of the variance (Table 7).

Table 7. Final study: Factor loadings for social network use of CAM.

		Factor 1
1	CAM use by parents	**.704**
2	CAM use by grandparents	**.769**
3	CAM use by other relatives	**.861**
4	CAM use by friends	**.772**
5	CAM use by coworkers	**.804**
6	CAM use by other people you know	**.769**

Demographic variables, such as gender, ethnicity, and school attended were assessed. Major fields of study were adopted from those used by the TAMUS. Geographic locations were adopted from Barnes et al. (2004) (Appendix C).

Sampling and Data Collection

The web-based survey used in this study was administered to undergraduate students enrolled in the Texas A&M University System (TAMUS) during the Fall 2004 semester. Open access lists of student names and email addresses were purchased from eight schools in the Texas A&M University System. Emails were not available from two of the TAMUS schools.

Based on a population size of approximately 70,000 undergraduates (Table 8) with usable emails, an appropriate sample size was determined to provide a representative sample and minimize error. To maintain a 95% confidence interval and a 5% sampling error, a sample size of 383 respondents was sufficient (Dillman, 2000). Response rates for a web-based survey of college students solicited through email can vary. Previous studies demonstrate response rates as low as 24% (n=772) (White, Jamieson-Drake, & Swartzwelder, 2002) and as high as 60% (n=600) (Pealer, Weiler, Pigg, Jr., Miller, & Dorman, 2001). After initially sending emails to 766 randomly selected students and experiencing difficulties with undeliverable email accounts, the recruited sample size was increased to 1587. The sample size was randomly selected using Microsoft Excel.

Table 8. Texas A&M University System undergraduate enrollment for fall 2003 (Texas Higher Education Coordinating Board, 2004). Only the eight participating schools are included in the table.

#	Code	University	Fall 2004 undergrad enrollment	Usable Emails
1	TAMU	Texas A&M University	36154	35488
2	PVAMU	Prairie View A&M University	8351	6147
3	TSU	Tarleton State University	7577	7336
4	TAMUG	Texas A&M University @ Galveston	1584	1551
5	TAMU-K	Texas A&M University-Kingsville	5626	5355
6	TAMIU	Texas A&M International University	4329	3542
7	WTAMU	West Texas A&M University	5704	5594
8	TAMU-C	Texas A&M University-Commerce	5363	4798
	TOTAL	**TEXAS A&M UNIVERSITY SYSTEM**	**74688**	**69811**

Recruitment was based upon Dillman's Tailored Design Method (2000), in which participants were solicited via a series of repeated contacts (Appendix A). Solicited participants were contacted via email and provided a website link and generic passcode. Students were provided a screen with an information sheet describing the study, their voluntary participation, the anonymity of responses, the 18-year-old age requirement, and other information to inform and protect participants (see Appendix F). Students became participants only when they selected an agree button to indicate their understanding of information on the information sheet. Only then were they provided access to the survey. To keep all responses anonymous, no identifying information was collected, no tracking system was used, and data were sent directly to a database.

Analyses

Multiple regression was the primary analysis used to identify significant predictors of CAM use. All statistical analyses were done using SPSS version 12.0.

Summary

Using the methods described in this chapter, data were collected and analyzed. Validity and reliability of the data were established. Factor analyses of three independent variables identified two outcome expectancies factors, one attitude toward CAM factor, and one observational learning factor to be included for regression. The following chapter reports the results of the data analyses.

CHAPTER IV

RESULTS

The purpose of this study was to assess the level of CAM use among undergraduate students enrolled within the Texas A&M University System and examine potential predictors of CAM use among this population. It specifically considers the relationships of perceived outcome expectancies, attitude toward CAM, and observational learning with CAM use.

Characteristics of Respondents

Of the 1,587 possible participants, 399 responded to requests for participation in the web-based survey. Surveys not completed in their entirety were excluded from analysis resulting in 345 completed surveys (response rate of 21%). Respondents ranged in age from 18 to 56 with 78% between the ages of 18 and 22 (see Table 9). The sample included 222 females (64.3%) and 123 males (35.7%). The majority identified themselves as White/Non-Hispanic (78.6%), followed by Hispanic (12.9%), Black/Non-Hispanic (3.5%), Asian or Pacific Islander (1.8%), American Indian or Alaskan Native (1.2%), Non-resident Alien or Foreign National (0.6%) and Other (1.5%). By undergraduate classification, the sample included 116 (33.7%) Seniors, 87 (25.3%) Juniors, 70 (20.3%) Sophomores, 67 (19.5%) Freshman, and four people who categorized themselves as "other." Over 66% of respondents (n=228) were from TAMU in College Station (see Table 3). Almost a quarter of respondents reported an engineering-related

major (24.2%), followed by liberal arts (17.2%), business (14.0%), and education/human development (13.4%) majors.

Table 9. Demographics of study participants.

Variable	No. (n=345)	%	Variable	No. (n=345)	%
Current Age			**School**		
Under 25	290	84.1	Texas A&M University	228	66.1
25 and Over	55	15.9	Prairie View A&M University	11	3.2
Gender			Tarleton State University	15	4.3
Male	123	35.7	Texas A&M University @ Galveston	9	2.6
Female	222	64.3	Texas A&M University-Kingsville	19	5.5
Ethnicity			Texas A&M International University	8	2.3
White/Non-Hispanic	268	77.7	West Texas A&M University	29	8.4
Hispanic	44	12.8	Texas A&M University-Commerce	26	7.5
Black/Non-Hispanic	12	3.5	**Classification**		
Asian or Pacific Islander	6	1.7	Freshman	67	19.4
American Indian or Alaskan Native	4	1.2	Sophomore	70	20.3
Non-resident Alien or Foreign Nation	2	0.6	Junior	87	25.2
Other/unknown	9	2.6	Senior	116	33.6
Current Marital Status			Unknown	5	1.5
Single, never married	289	83.8	**Major**		
Married	35	10.1	Agriculture/Life Sciences	39	11.3
Divorced/separated	16	4.7	Architecture	9	2.6
Other/unknown	5	1.4	Business	48	13.9
Geographic Location of Birth			Education/Human Development	46	13.3
Northeast	7	2.0	Engineering	83	24.1
Midwest	15	4.3	General Studies/Undecided	13	3.8
South	280	81.2	Liberal Arts	59	17.1
Texas	230	66.7	Medicine/Veterinary Medicine	9	2.6
West	13	3.8	Science/Geoscience	37	10.8
International	15	4.3	**Housing During College**		
Unknown	4	1.2	Off-Campus	243	70.4
Geographic Location of High School Graduation			With parents/relatives	21	6.1
Northeast	–	–	With spouse	31	9.0
Midwest	6	1.7	With roommates	157	45.5
South	323	93.6	With children	5	1.4
Texas	288	83.5	Alone	29	8.4
West	4	1.2	On-Campus	98	28.4
International	4	1.2	Other/unknown	4	1.2
Unknown	1	0.3			

The vast majority of participants (81.9%) were born in the southern United States with 67.3% actually born in Texas. The percentages of participants who graduated from a high school in the southern United States and Texas were even greater at 93.9% and 83.7%, respectively. Eighty-four percent reported being single, never married and another 10% reported being married. Over 45% of participants lived off-campus with roommates while another 28.4% lived on-campus in a dormitory or apartment. Other participants lived off-campus with their spouse (9.0%), their parents (5.6%), their children (1.5%), or alone (8.5%).

Prevalence of CAM Use

Overall Use of CAM during the Lifetime

Table 10 demonstrates the rates of use reported by participants with variations in the CAM therapies included or excluded for analysis. When all variables were considered, over 98% of participants reported using at least one form of CAM in their lifetime. Over a quarter reported using four or five different CAM practices in their lifetime and 13.1% reported using over 10 practices. When prayer and exercise variables were excluded, rates of lifetime use reduced to 83.8%, over 62% reported using between one and five CAM therapies, and people using over 10 therapies reduced to 4.2%.

As indicated in Table 11, use was examined in sub-groups of CAM variables. For lifetime use of practitioner-based or behavior-based CAM therapies, 72.2% of participants reported using at least one therapy. The most common therapies used were massage (53.9%), deep breathing exercises (35.9%), yoga (28.7%), chiropractic (26.4%), and meditation (22.0%). Use of dietary supplements was reported by 53.6% of

participants. Non-vitamin, non-mineral supplements were the most commonly used, followed by megavitamins and performance enhancers. Over 30% of participants reported dieting in at some point in their lifetimes and the Atkins diet was reported almost twice as often as the next closest diet. For lifetime use, Atkins was reported by 20.3% of participants, followed by Vegetarianism (10.4) and South Beach (8.1%). Eighty-two percent of participants reported use of prayer for health reasons in their lifetimes. High rates of use were reported for prayer for own health (77.4%), others prayed for your health (68.1%), and group prayer (57.7%). Eighty-seven percent reported exercising during their lifetime to benefit their health.

Table 10. Lifetime and college CAM use by the number of therapies used.

Variables included in definition of CAM use	0 Therapies n=345	%	1-5 Therapies n=345	%	6-10 Therapies n=345	%	>10 Therapies n=345	%
DURING LIFETIME								
All CAM Variables Included	6	1.7	152	44.0	142	41.2	45	13.1
No Prayer	13	3.8	230	66.7	83	24.0	19	5.5
No Exercise	16	4.6	174	50.4	127	36.8	28	8.2
No Prayer or Exercise	56	16.2	215	62.3	60	17.3	14	4.2
DURING COLLEGE								
All CAM Variables Included	17	4.9	219	63.5	93	26.9	16	4.7
No Prayer	32	9.3	266	77.1	38	11.0	9	2.6
No Exercise	48	13.9	218	63.3	68	19.6	11	3.2
No Prayer or Exercise	108	31.3	205	59.3	25	7.3	7	2.1

Table 11. Frequencies & percentages of participants reporting use of CAM during college and the lifetime.

Variables Included in definitic of CAM use	During College n=345	%	During Lifetime n=345	%
All (n=33)	328	95.1	339	98.3
No Prayer (n=29)	313	90.7	332	96.2
No Exercise (n=32)	297	86.1	329	95.4
No Prayer or Exercise (n=28)	237	68.7	289	83.8
CAM Therapies				
All Therapies (n=18)	186	53.9	249	72.2
Acupuncture	7	2.0	9	2.6
Ayurveda	--	--	--	--
Homeopathy	16	4.6	25	7.2
Naturopathy	12	3.5	15	4.3
Chelation	--	--	--	--
Folk Medicine	10	2.9	34	9.9
Chiropractic	37	10.7	91	26.4
Massage	125	36.2	186	53.9
Biofeedback	7	2.0	13	3.8
Meditation	49	14.2	76	22.0
Guided Imagery	19	5.5	33	9.6
Progressive Relaxation	27	7.8	45	13.0
Deep Breathing Exercises	83	24.1	124	35.9
Hypnosis	4	1.2	15	4.3
Yoga	77	22.3	99	28.7
Tai Chi	12	3.5	17	4.9
Qi Gong	2	0.6	3	0.9
Healing Therapy/Reiki	5	1.4	7	2.0
Dietary Supplements				
All Supplements (n=3)	129	37.4	185	53.6
Megavitamins	44	12.8	76	22.0
Non-vitamin, Non-mineral	101	29.3	152	44.1
Performance Enhancers	38	11.0	58	16.8
Diets				
All Diets (n=7)	74	21.4	106	30.7
Vegetarianism	16	4.6	36	10.4
Macrobiotics	--	--	2	0.6
Atkins	43	12.5	70	20.3
Pritikin	--	--	2	0.6
Ornish	1	0.3	2	0.6
Zone	10	2.9	13	3.8
South Beach	23	6.7	28	8.1
Prayer				
All Prayer (n=4)	241	69.9	285	82.6
Prayed for own health	210	60.9	267	77.4
Others prayed for your heal	163	47.2	235	68.1
Group prayer	129	37.4	199	57.7
Healing ritual	11	3.2	27	7.8
Exercise				
Exercise for Health (n=1)	277	80.3	300	87.0

Overall Use of CAM during College

When all variables were considered, over 95% of participants reported using at least one form of CAM since beginning college. Three was the mode number of CAM therapies reported by 15.4% of participants. More than 63% reported using between one and five practices while 4.7% reported using over 10 practices since the start of their college career. When prayer and exercise variables were excluded, rates of college use reduced to 68.7%, over 59.3% reported using between one and five CAM therapies, and people using over 10 therapies reduced to 2.1%.

Over 54% reported using a practitioner-based or behavior-based CAM therapy since starting college. Massage (36.2%), deep breathing exercises (24.1%), and yoga (22.3%) were the most popular. For dietary supplement use, 37.4% reported using supplements at least one time with almost 30% reporting use of non-vitamin, non-mineral substances. Eleven percent reported use of performance enhancing supplements. The most popular college diet was Atkins (12.5%) followed by the South Beach Diet (6.7%) and Vegetarianism (4.6%). Almost 70% of participants reported using prayer for health reasons since starting college and over 80% reported exercising for health reasons.

Scaled Variables

Attitude toward CAM

A summary of responses to attitude items on the survey can be found in Table 12. Mean scores, standard deviations, and ranges are summarized in Table 13. The mode score for each item was three meaning most respondents were neutral (did not disagree or agree) with the statements. The overall attitude toward CAM was slightly negative with a

mean score of 2.84. Thirty-one percent of respondents believed alternative therapists are quacks, while over a quarter believed most alternative therapies do not work. Almost 40% would not recommend alternative therapy to a friend and nearly 37% reported they would not trust an alternative therapist. On the reverse side, almost 14% reported trust in an alternative therapist, over 17% of respondents believed in the abilities of alternative therapists, nearly 22% believe CAM therapies do work, and 16.5% would recommend CAM to a friend. Even with the overall attitudes slightly skewed to the negative, over 35% disagree and over 41% remain neutral with the statement they would never use the services of an alternative therapist.

Table 12. Attitude toward CAM scores.

		Range 1-5		% who Strongly Agree	% who Agree	% Unsure	% who Disagree	% who Strongly Disagree
		Mean	SD	5	4	3	2	1
1	I think most alternative therapists are quacks.*	3.22	0.856	9.0	22.0	51.6	16.2	0.9
2	I think most alternative therapies do not work.*	3.10	0.826	6.4	20.0	51.6	21.2	0.6
3	I would never use the therapies of an alternative therapist.*	2.85	0.977	5.5	17.1	41.4	28.7	6.7
4	I would recommend alternative medicine to any one of my friends who might get ill.	2.72	0.915	3.2	13.3	44.1	31.0	7.8
5	I trust most alternative therapists.	2.68	0.848	0.9	12.8	49.0	28.1	8.7
	Average of Attitude Toward CAM Total							
	(Range 5-25)	**14.20**	**3.630**					
	*Reverse score used for items 1, 2, and 3 in factor analysis and regression.							

Table 13. Means, standard deviations, and possible ranges for predictor and dependent variables.

Variables n=345	Mean	SD	Range	Theoretical Mean	A Higher Score Means…
DEPENDENT VARIABLES					
College Use	4.52	3.30	0-33	16.5	More CAM therapies used
Lifetime Use	6.55	3.93	0-33	16.5	More CAM therapies used
INDEPENDENT VARIABLES					
Attitude Toward CAM	14.20	3.63	5-25	15	More positive attitude
Observational Learning	2.01	1.85	0-6	3	More social groups known to use CAM
Encounter Outcome Expectancies	35.12	4.61	8-40	24	Higher values placed on health care encounter outcomes
Personal Outcome Expectancies	11.92	1.97	3-15	9	Higher values placed on personal health care outcomes

Observational Learning

Observational learning assessed the number of social groups respondents reported as users of CAM. Over 45% of respondents reported friends as CAM users while parents, grandparents, other relatives, and other people in their social circles were reported as CAM users by 35, 31, 36, and 37% of participants, respectively (Table 14). Over 30% reported not knowing anyone in the six social network groups who is a user of CAM. Most people indicated knowing people in at least one and up to four different social network groups to be CAM users. Almost 5% reported knowing CAM users in each of the six categories.

Table 14. Percentage of participants reporting use of CAM among people in their social network.

	Social Network Groups	% Yes	% No/Unsure
1	Parents	35.1	64.9
2	Grandparents	30.1	69.9
3	Other Relatives	35.7	64.3
4	Friends	45.8	54.2
5	Coworkers	17.7	82.3
6	Other People You Know	37.1	62.9

Outcome Expectancies

The undergraduate participants reported high outcome expectancy scores related to their health care (Table 15). Highest mean scores (4.50 and higher) arose for statements regarding risks being explained in a clear and understandable manner, support of overall health, and improvement in the individual's situation. Statements with mean scores between 4.25 and 4.49 include adequate time spent with the health care provider, support beyond the illness, minimal risk associated with treatment, reduced anxiety, and increased relaxation. Mean scores between 4.0 and 4.24 arose for respect regarding health care beliefs, helpful information provided by the health care provider, immediate improvement in problems, and visit worth the individual's time. The lowest mean scores had to do with statements regarding monetary cost (mean=3.97) and concerns being effectively addressed by the health care provider (mean=3.67).

Table 15. Outcome expectancy ratings regarding health care.

		Range 1-5		% Very Important	% Important	% Unsure	% Unimportant	% Very Unimportant
		Mean	SD	5	4	3	2	1
1	The health care provider seems to support my overall health.	4.55	0.722	62.9	32.5	3.2	0.6	--
2	Following the advice of my health care provider will improve my situation.	4.51	0.712	59.4	34.2	5.2	0.6	0.6
3	The health care provider spends adequate time with me.	4.40	0.764	52.2	38.8	7.0	1.4	--
4	I believe the health care provider will support me beyond my illness.	4.41	0.820	23.6	38.6	5.5	0.9	0.3
5	The health care provider respects my health care beliefs.	4.14	0.978	42.9	36.2	16.5	1.4	2.0
6	Risks associated with the treatment are minimal.	4.45	0.722	53.3	41.4	4.1	0.3	--
7	Risks are explained to me in a clear and understandable way.	4.58	0.796	68.4	26.4	3.2	0.6	--
8	The visit is worth the monetary cost.	3.97	0.957	32.5	40.6	21.7	5.2	2.0
9	I am less anxious about my health.	4.29	0.913	50.1	35.4	9.9	2.9	1.2
10	Helpful information is provided by the health care provider.	4.17	0.882	41.4	39.4	16.2	1.4	0.9
11	Concerns are effectively addressed by the health care provider.	3.67	0.946	19.4	39.1	33.6	5.5	1.7
12	I experience immediate improvement in problems.	4.18	0.746	35.1	50.4	13.0	0.9	0.3
13	The visit is worth the time spent planning it, getting to it, waiting for it, and having it.	4.03	0.894	31.3	46.4	18.8	1.2	1.7
14	I experience increased relaxation.	4.33	0.767	47.2	41.2	10.1	0.6	0.6
	Average Outcome Expectancies Total Score (Range 5-70)	**59.69**	**7.938**					

Predictors of CAM Use

Regression with All CAM Variables Included in the Definition of CAM

Correlation coefficients between the variables included in the regression are shown Table 16. All associations are significantly different than zero but small in magnitude which means low multi-collinearity between variables. Regression was run on each variable to determine its significance without accounting for other variables. For use of CAM during college (Table 17), gender, attitude toward CAM, social network use, encounter outcome expectancies, and personal outcome expectancies were highly significant ($p<.001$). Undergraduate classification ($p<.001$) showed a highly significant negative relationship to college use. For major in school, only the engineering majors ($p<.01$) showed a significant negative relationship to college use. Ethnicity and university attended showed no significant tendencies as independent predictors of college use of CAM. For lifetime use of CAM (Table 18), gender, attitude toward CAM, social network use, encounter outcome expectancies, and personal outcome expectancies were again highly significant ($p<.001$). Engineering again showed a significant relationship ($p<.01$) and ethnicity again showed no significant relationship on its own as a predictor. TAMU arose as a significant group in the university attended variable ($p<.05$).

Table 16. Correlation coefficients between variables.

	Variables	D1 College Use	D2 Lifetime Use	P1 Encounter Outcome Expectancies	P2 Personal Outcome Expectancies	P3 Attitude Toward CAM
D2	Lifetime Use	.847***				
P1	Encounter Outcome Expectancies	.209***	.200***			
P2	Personal Outcome Expectancies	.174***	.209***	.532***		
P3	Attitude Toward CAM	.305***	.346***	.156***	.118*	
P4	Social Network Use	.296***	.361***	.080***	.147**	.245***

*p<.05, **p<.01, ***p<.001, D1-D2=Dependent Variable, P1-P4=Predictor Variables

Table 17. Metric and standardized beta coefficients per each independent variable in relation to CAM use during college.

			Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7		Model 8		Model 9	
Predictors			Adj R^2=.067		Adj R^2=.001		Adj R^2=.105		Adj R^2=.041		Adj R^2=.042		Adj R^2=.093		Adj R^2=.085		Adj R^2=.041		Adj R^2=.027	
	Mean	SD	B	ß	B	ß	B	ß	B	ß	B	ß	B	ß	B	ß	B	ß	B	ß
Constant			3.374		3.6		5.901		5.316		5.351		.625		3.456		-18.386		1.055	
			(.288)		(-0.179)		(.283)		(.741)		(.530)		(.666)		(.251)		(5.777)		(1.074)	
Gender	0.64	0.48	1.775																	
			(.358)	.258***																
Ethnicity																				
White	0.78	0.42			1															
					(-.747	0.1														
Black	0.03	0.18			-0.2															
					-1.2	0														
Hispanic	0.13	0.33			0.9															
					0.9	0.1														
Undergraduate Classfication																				
Freshman	0.19	0.4					-2.931													
							(.475)	-.352***												
Sophomore	0.20	0.4					-1.987													
							(.468)	-.243***												
Junior	0.25	0.44					-1.636													
							(.438)	-.216***												
University Attending																				
TAMU	0.66	0.47							-1.079											
									(.771)	-.155										
Prairie View	0.03	0.18							-2.316											
									(1.22	-.124										
Tarleton State	0.04	0.2							-1.582											
									(1.11	-.098										
Galveston	0.02	0.15							-.441											
									(1.36	-.020										
Kingsville	0.08	0.28							1.512											
									(.953)	.127										
International	0.03	0.16							-1.094											
									(1.30	-.053										
West Texas	0.08	0.26							-.431											
									(.975)	-.035										
Major in School																				
Ag/Life Science	0.11	0.32									-.582									
											(.740)	-.056								
Architecture	0.03	0.16									-2.018									
											(1.19	-.098								
Business	0.14	0.35									-1.122									
											(.706)	-.118								
Education/	0.13	0.34									-.243									
Human Develop.											(.712)	-.025								
Engineering	0.24	0.43									-1.881									
											(.638)	-.244**								
General Studies/Und.	0.04	0.2									-2.218									
											(.988)	-.137*								
Liberal Arts	0.17	0.38									.072									
											(.677)	.008								
Medicine/Vet Med.	0.03	0.16									.315									
											(1.19	.015								
Attitude Toward CAM	16.43	4.31											.237							
													(.039)	.310***						
Social Network Use	2.01	1.85													0.5					
															(-0.09	.296***				
Encounter Outcome Expectancies	39.12	1.2															.585			
																	(.148)	.209***		
Personal Outcome Expectancies	11.88	2.07																	.290	
																			(.089)	.174**

*p<.05
**p<.01
***p<.001

Table 18. Metric and standardized beta coefficients per each independent variable in relation to CAM use during the lifetime.

Predictors	Mean	SD	Model 1 Adj R^2=.066 B	ß	Model 2 Adj R^2=.001 B	ß	Model 3 Adj R^2=.030 B	ß	Model 4 Adj R^2=.056 B	ß	Model 5 Adj R^2=.033 B	ß	Model 6 Adj R^2=.121 B	ß	Model 7 Adj R^2=.127 B	ß	Model 8 Adj R^2=.037 B	ß	Model 9 Adj R^2=.041 B	ß
Constant			5.163		5.476		7.504		7.895		7.486		1.282		5.008		-19.507		1.588	
			(.343)		(.857)		(.352)		(.876)		(.636)		(.783)		(.292)		(6.904)		(1.272)	
Gender	0.64	0.48	2.153																	
			(.427)	.263***																
Ethnicity					1.169															
White	0.78	0.42			(.890)	.124														
					-.310															
Black	0.03	0.18			(1.422	-.014														
					1.365															
Hispanic	0.13	0.33			(1.042	.116														
Undergraduate Classfication																				
Freshman	0.19	0.4					-1.758													
							(.590)	-.177**												
Sophomore	0.20	0.4					-1.818													
							(.581)	-.186**												
Junior	0.25	0.44					-.975													
							(.544)	-.108												
University Attending																				
TAMU	0.66	0.47							-1.890											
									(.912)	-.228*										
Prairie View	0.03	0.18							-2.622											
									(1.447)	-.117										
Tarleton State	0.04	0.2							-2.095											
									(1.319)	-.109										
Galveston	0.02	0.15							-.770											
									(1.610)	-.030										
Kingsville	0.08	0.28							1.347											
									(1.128)	.095										
International	0.03	0.16							-1.117											
									(1.546)	-.045										
West Texas	0.08	0.26							.144											
									(1.153)	.010										
Major in School																				
Ag/Life Science	0.11	0.32									-1.384									
											(.887)	-.112								
Architecture	0.03	0.16									-2.486									
											(1.437	-.101								
Business	0.14	0.35									-1.341									
											(.846)	-.118								
ducation/Human Develop.	0.13	0.34									.057									
											(.854)	.005								
Engineering	0.24	0.43									-2.007									
											(.764)	-.226**								
General Studies/Und.	0.04	0.2									-1.220									
											(1.183	-.063								
Liberal Arts	0.17	0.38									.005									
											(.811)	.000								
Medicine/Vet Med.	0.03	0.16									.514									
											(1.437	.021								
Attitude Toward CAM	16.43	4.31											.321							
													(.046)	.352***						
Social Network Use	2.01	1.85													0.8					
															(.107)	.361***				
Encounter Outcome Expec	39.12	1.2															.666			
																	(.176)	.200***		
Personal Outcome Expecta	11.88	2.07																	.416	
																			(.105)	.209***

*p<.05
**p<.01
***p<.001

Linear regression was used to determine how the four theoretical construct variables behaved together in predicting CAM use. The model was highly significant at $p<.001$. Attitude toward CAM ($p<.001$), social network use ($p<.001$), and encounter outcome expectancies ($p<.05$) were significant contributors to the model while personal outcome expectancies was not ($p=.465$). For lifetime use, attitude toward CAM ($p<.001$), social network use ($p<.001$), and encounter outcome expectancies ($p<.01$) were significant contributors when only those three variable were in the model. Once the personal outcome expectancies variable was added, neither outcome expectancies variable was significant.

Hierarchical Regression for CAM Use During College

Hierarchical regression was run to determine how variables would react once demographics were accounted for. Gender and ethnicity were entered together, followed by undergraduate classification, university attended, and major in school. Once those variables were accounted for, the theoretical construct variables were added in the following order: attitude toward CAM, social network use, encounter outcome expectancies, and personal outcome expectancies. The following sections provide results first for CAM use during college and then for CAM use during the lifetime with different variables included in the definition of use. The order is as follows:

- CAM use during college
    1) All variables included in definition of CAM
    2) Exercise for health reasons excluded from definition of CAM

3) Exercise for health reasons and prayer for health reasons excluded from definition of CAM
4) Only CAM therapies included in definition of CAM

- CAM use during the lifetime
    1) All variables included in definition of CAM
    2) Exercise for health reasons excluded from definition of CAM
    3) Exercise for health reasons and prayer for health reasons excluded from definition of CAM
    4) Only CAM therapies included in definition of CAM

College CAM Use with All CAM Options Included in the Definition of CAM

When all CAM options (exercise, prayer, diets, supplements, and therapies) were included in the definition of CAM, model seven (Table 19) was the strongest with an adjusted R squared score of.347, explaining 34.7% of the variance. Gender, undergraduate classification, attitude toward CAM, and social network use appear to have an independent effect on the dependent variable. They maintain highly significant standardized beta scores throughout each model. Kingsville demonstrated a consistent negative effect as a university attended while engineering did the same as a major. Encounter outcome expectancies showed a significant relationship in model seven, but that significance disappeared in model eight with the addition of personal outcome expectancies. Ethnicity did not show any significant effects. An ANOVA was run to compare means for gender. The analysis shows females are significantly likely to have

higher CAM use scores for college use, F (1, 343)=24.506, p<.001, and lifetime use, F (1,343)=25.412, p<.001).

Table 19. Hierarchical regression coefficients for CAM use during college when all variables included in the definition of CAM.

Predictors	Model 1 Adj R^2=.068		Model 2 Adj R^2=.178		Model 3 Adj R^2=.204		Model 4 Adj R^2=.211		Model 5 Adj R^2=.277		Model 6 Adj R^2=.338		Model 7 Adj R^2=.347		Model 8 Adj R^2=.345	
	B	ß	B	ß	B	ß	B	ß	B	ß	B	ß	B	ß	B	ß
Constant	2.573		4.076		4.507		5.419		1.999		1.603		-10.289		-9.816	
	(.724)		(.717)		(.946)		(1.117)		(1.234)		(1.183)		(5.218)		(5.579)	
Gender	1.830		1.898		1.835		1.585		1.197		1.123		1.011		1.007	
	(.361)	.266***	(.340)	.276***	(.337)	.267***	(.355)	.231***	(.347)	.174***	(.332)	.163***	(.333)	.147**	(.334)	.146**
Ethnicity																
White	.873		.711		.599		.671		.818		.926		.973		.984	
	(.722)	.110	(.679)	.090	(.674)	.076	(.680)	.085	(.651)	.103	(.624)	.117	(.620)	.123	(.622)	.124
Black	-.834		-.780		-.566		-.381		-.506		.209		.139		.146	
	(1.158)	-.046	(1.091)	-.043	(1.322)	-.032	(1.325)	-.021	(1.268)	-.028	(1.220)	.012	(1.212)	.008	(1.214)	.008
Hispanic	.906		.712		-.424		-6.19		-.831		-.789		-.803		-.806	
	(.844)	.092	(.794)	.072	.849	-.043	(.851)	-.063	(.815)	-.084	(.780)	-.080	(.775)	-.081	(.776)	-.082
Undergraduate Classfication																
Freshman			-2.989		-2.775		-2.661		-2.169		-2.858		-2.832		-2.825	
			(.457)	-.359***	(.457)	-.334***	(.464)	-.320***	(.444)	-.315***	(.427)	-.343***	(.424)	.340***	(.426)	-.340***
Sophomore			-1.895		-1.660		-1.609		-1.509		-1.470		-1.405		-1.402	
			(.450)	-.232***	(.448)	-.203***	(.454)	-.197***	(.435)	-.184***	(.417)	-.180***	(.415)	-.172***	(.415)	-.171***
Junior			-1.713		-1.533		-1.420		-1.175		-1.162		-1.081		-1.078	
			(.422)	-.226***	(.425)	-.202***	(.427)	-.187***	(.411)	-.155**	(.393)	-.153**	(.392)	-.143**	(.393)	-.142**
University Attending																
TAMU					-.626		-.655		-.584		-.444		-.265		-.275	
					(.710)	-.090	(.725)	-.094	(.694)	-.084	(.665)	-.064	(.665)	-.038	(.667)	-.040
Prairie View					-.868		-1.436		-1.389		-1.918		-1.639		-1.653	
					(1.392)	-.046	(1.422)	-.077	(1.361)	-.074	(1.306)	-.102	(1.302)	-.087	(1.306)	-.088
Tarleton State					-.895		-1.156		-.821		-.587		-.433		-.432	
					(1.030)	-.055	(1.042)	-.072	(.999)	-.051	(.957)	-.036	(.953)	-.027	(.954)	-.027
Galveston					-.077		-.721		-1.017		-.685		-.427		-.425	
					(1.257)	-.004	(1.357)	-.033	(1.299)	-.046	(1.245)	-.031	(1.241)	-.020	(1.243)	-.019
Kingsville					2.052		2.002		2.020		1.856		1.990		1.976	
					(.958)	.173*	(.960)	-.169*	(.918)	.170*	(.880)	.156*	(.875)	.168*	(.878)	.167*
International					-.321		-.342		-.520		-.760		-.326		-.309	
					(1.256)	-.016	(1.261)	-.017	(1.207)	-.025	(1.156)	-.037	(1.163)	-.016	(1.167)	-.015
West Texas					.229		-.179		-.520		-.315		-.258		-.249	
					(.897)	.018	(.921)	-.014	(.883)	-.042	(.846)	-.025	(.841)	-.021	(.843)	-.020
Major in School																
Ag/Life Science							-.518		-.515		-.584		-.745		-.732	
							(.717)	-.050	(.686)	-.050	(.657)	-.056	(.656)	-.072	(.660)	-.070
Architecture							-1.704		-1.738		-1.341		-1.389		-1.366	
							(1.133)	-.083	(1.084)	-.084	(1.041)	-.065	(1.034)	-.067	(1.039)	-.066
Business							-1.251		-1.300		-1.206		-1.224		-1.226	
							(.693)	-.132	(.663)	-.137	(.635)	-.127	(.631)	-.129	(.632)	-.129
Education/Human Develop.							-.749		-.715		-.492		-.435		-.429	
							(.689)	-.077	(.659)	-.074	(.632)	-.051	(.628)	-.045	(.630)	-.044
Engineering							-1.229		-1.219		-1.184		-1.158		-1.148	
							(.632)	-.160	(.605)	-.158*	(.579)	-.154*	(.575)	-.150*	(.577)	-.149*
General Studies/Und.							-1.333		-1.363		-1.025		-1.043		-1.045	
							(.927)	-.083	(.887)	-.084	(.851)	-.064	(.846)	-.065	(.847)	-.065
Liberal Arts							-.284		-.106		.059		.096		.106	
							(.663)	-.032	(.636)	-.012	(.609)	.007	(.605)	.011	(.607)	.012
Medicine/Vet Med.							1.054		.920		1.338		1.225		1.226	
							(1.171)	.051	(1.121)	.045	(1.076)	.065	(1.069)	.059	(1.071)	.059
Attitude Toward CAM									.209		.163		.155		.155	
									(.038)	.268***	(.037)	.209***	(.037)	.198***	(.037)	.198***
Social Network Use											.459		.451		.449	
											(.083)	.258***	(.083)	.254***	(.083)	.253***
Encounter Outcome Expectancies													.304		.285	
													(.130)	.109*	(.125)	.102
Personal Outcome Expectancies															.022	
															(.091)	.013

*p<.05
**p<.01
***p<.001

College CAM Use When Exercise Excluded from Definition of CAM

When exercise was excluded from the dependent CAM use variable, CAM use during college followed nearly identical patterns as when exercise was included (Table 20). Gender, freshman, sophomore, junior, Kingsville, attitude toward CAM, and social network use demonstrated significant scores and independent effects as they maintained those significant scores in all models. Encounter outcome expectancies was significant ($p<.05$) until personal outcome expectancies was added to the model. Engineering did not show significance as it did when exercise was included in the CAM use during college model.

College CAM Use When Exercise and Prayer Excluded from the Definition of CAM

College use of CAM when exercise and prayer were excluded from the model shows some interesting patterns (Table 21). Gender was significant until the socio-cognitive variables were included in model five. All three undergraduate classifications were significant after university attending was added to the model. In relation to the senior dummy variable, freshman showed a highly significant ($p<.001$) negative relationship, sophomores showed a strongly significant ($p<.01$) negative relationship, and juniors showed a significant ($p<.05$) negative relationship beginning in model three. Kingsville again showed a positive independent effect in which the significance increased as socio-cognitive variables were added to the models. Agriculture/life sciences, business, and engineering majors showed significant ($p<.05$), yet inconsistent, trends. Attitude toward CAM and social network use again demonstrated high significance and

independent effects. Encounter outcome expectancies was significant ($p<.05$) until personal outcome expectancies was added to the model.

College CAM Use When Only CAM Therapies Included in Definition of CAM

Hierarchical regression was run to determine CAM use during college when only specific CAM therapies was included in the dependent variable (excluding exercise, prayer, diets, and supplements) (Table 22). Gender was significant until encounter and personal outcome expectancies were added to the model. All undergraduate classifications were significant and negative in each model with freshman at $p<.001$, sophomore at $p<.01$, and junior at $p<.05$ when compared to seniors. Kingsville was significant ($p<.05$) in all models maintaining a standardized beta score of .181 to .193. Attitude toward CAM and social network use again showed an independent effect with highly significant predictive scores. Encounter outcome expectancies was significant ($p<.05$) until personal outcome expectancies was added to the model. Major in school, ethnicity, and personal outcome expectancies showed no significant effects.

Table 20. Hierarchical regression coefficients for CAM use during college when exercise for health excluded from the definition of CAM.

Predictors	Model 1 Adj R^2=.070 ß	Model 2 Adj R^2=.172 ß	Model 3 Adj R^2=.202 ß	Model 4 Adj R^2=.206 ß	Model 5 Adj R^2=.283 ß	Model 6 Adj R^2=.338 ß	Model 7 Adj R^2=.346 ß	Model 8 Adj R^2=.344 ß
Constant								
Gender	.273***	.283***	.247***	.243***	.182***	.172***	.156***	.156**
Ethnicity								
White	.114	.094	.080	.090	.110	.123	.129	.130
Black	-.030	-.027	-.029	-.019	-.027	.011	.007	.008
Hispanic	.094	.075	-.039	-.057	-.081	-.076	-.078	-.078
Undergraduate Classfication								
Freshman		-.347***	-.322***	-.312***	-.306***	-.334***	-.331***	-.330***
Sophomore		-.223***	-.195***	-.191***	-.178***	-.174***	-.166***	-.166***
Junior		-.219***	-.199***	-.186***	-.151**	-.150**	-.139**	-.139**
University Attending								
TAMU			-.101	-.110	-.100	-.080	-.055	-.057
Prairie View			-.028	-.059	-.056	-.083	-.069	-.069
Tarleton State			-.065	-.081	-.058	-.045	-.035	-.035
Galveston			-.010	-.039	-.054	-.039	-.028	-.028
Kingsville			.170*	.166*	.167*	.154*	.165*	.164*
International			-.027	-.030	-.039	-.050	-.030	-.029
West Texas			.028	-.006	-.035	-.019	-.015	-.014
Major in School								
Ag/Life Science				-.043	-.043	-.049	-.064	-.063
Architecture				-.076	-.078	-.060	-.062	-.061
Business				-.128	-.133	-.124	-.126	-.126
Education/ Human Develop.				-.077	-.074	-.052	-.046	-.045
Engineering				-.141	-.140	-.136	-.132	-.131
General Studies/Und.				-.069	-.071	-.051	-.053	-.053
Liberal Arts				-.033	-.011	.007	.011	.012
Medicine/Vet Med.				.054	.047	.066	.061	.061
Attitude Toward CAM					.288***	.232***	.221***	.221***
Social Network Use						.246***	.242***	.241***
Encounter Outcome Expectancies							.106*	.098
Personal Outcome Expectancies								.014

*p<.05
**p<.01
***p<.001

Table 21. Hierarchical regression coefficients for CAM use during college when exercise for health and prayer for health excluded from the definition of CAM.

Predictors	Model 1 Adj R^2=.037 ß	Model 2 Adj R^2=.123 ß	Model 3 Adj R^2=.168 ß	Model 4 Adj R^2=.169 ß	Model 5 Adj R^2=.288 ß	Model 6 Adj R^2=.333 ß	Model 7 Adj R^2=.346 ß	Model 8 Adj R^2=.347 ß
Constant								
Gender	.199***	.207***	.194***	.169**	.094	.085	.066	.063
Ethnicity								
White	.100	.082	.072	.087	.112	.124	.131	.137
Black	-.048	-.045	-.068	-.060	-.069	-.034	-.039	-.037
Hispanic	.100	.082	-.057	-.067	-.096	-.092	-.094	-.095
Undergraduate Classfication								
Freshman		-.320	-.290***	-.286***	-.280***	-.305***	-.301***	-.297***
Sophomore		-.215	-.181***	-.182**	-.166**	-.161**	-.152**	-.151**
Junior		-.208	-.182**	-.167**	-.124*	-.123*	-.110*	-.109*
University Attending								
TAMU			-.113	-.117	-.103	-.086	-.056	-.062
Prairie View			-.002	-.023	-.020	-.044	-.027	-.031
Tarleton State			-.075	-.081	-.053	-.041	-.029	-.029
Galveston			-.007	-.045	-.063	-.049	-.036	-.035
Kingsville			.212*	.208*	.210**	.198**	.211**	.206**
International			-.024	-.027	-.038	-.048	-.024	-.020
West Texas			-.009	-.035	-.071	-.057	-.052	-.048
Major in School								
Ag/Life Science				-.115	-.114	-.120	-.138*	-.132*
Architecture				-.097	-.099	-.082	-.085	-.080
Business				-.136	-.143*	-.134*	-.137*	-.137*
Education/ Human Develop.				-.108	-.104	-.083	-.077	-.074
Engineering				-.157	-.156*	-.152*	-.148*	-.142
General Studies/Und.				-.075	-.077	-.059	-.060	-.061
Liberal Arts				-.067	-.041	-.024	-.019	-.014
Medicine/Vet Med.				.030	.022	.040	.033	.033
Attitude Toward CAM					.354***	.303***	.290***	.291***
Social Network Use						.225***	.220***	.215***
Encounter Outcome Expectancies							.126**	.096
Personal Outcome Expectancies								.059

*p<.05
**p<.01
***p<.001

Table 22. Hierarchical regression coefficients for CAM use during college when only CAM therapies included in the definition of CAM.

Predictors	Model 1 Adj R^2=.046 ß	Model 2 Adj R^2=.107 ß	Model 3 Adj R^2=.135 ß	Model 4 Adj R^2=.136 ß	Model 5 Adj R^2=.243 ß	Model 6 Adj R^2=.283 ß	Model 7 Adj R^2=.290 ß	Model 8 Adj R^2=.288 ß
Constant								
Gender	.221***	.227***	.213***	.193***	.122*	.113*	.098	.096
Ethnicity								
White	.100	.089	.008	.095	.119	.130	.135	.139
Black	-.048	-.043	-.054	-.043	-.052	-.020	-.023	-.022
Hispanic	.069	.056	-.071	-.080	-.107	-.103	-.105	-.106
Undergraduate Classfication								
Freshman		-.257***	-.229***	-.226***	-.220***	-.243***	-.240***	-.238***
Sophomore		-.201***	-.169**	-.167**	-.152**	-.148**	-.140**	-.140**
Junior		-.202***	-.178**	-.167**	-.126*	-.125*	-.115*	-.114*
University Attending								
TAMU			-.090	-.092	-.079	-.063	-.039	-.043
Prairie View			-.013	-.038	-.035	-.058	-.044	-.046
Tarleton State			-.095	-.103	-.077	-.065	-.056	-.056
Galveston			.010	-.019	-.036	-.024	-.013	-.013
Kingsville			.190*	.191*	.193*	.181*	.192*	.188*
International			-.008	-.007	-.018	-.027	-.008	-.006
West Texas			-.017	-.044	-.078	-.064	-.060	-.058
Major in School								
Ag/Life Science				-.097	-.096	-.102	-.116	-.112
Architecture				-.070	-.072	-.056	-.058	-.055
Business				-.100	-.106	-.098	-.100	-.100
Education/ Human Develop.				-.105	-.100	-.081	-.076	-.074
Engineering				-.124	-.122	-.119	-.116	-.112
General Studies/Und.				-.070	-.073	-.056	-.057	-.057
Liberal Arts				-.048	-.023	-.007	-.003	.000
Medicine/Vet Med.				.054	.045	.062	.057	.057
Attitude Toward CAM					.336***	.288***	.278***	.278***
Social Network Use						.212***	.208***	.204***
Encounter Outcome Expectancies							.009*	.080
Personal Outcome Expectancies								.038

*p<.05
**p<.01
***p<.001

Hierarchical Regression for CAM Use during the Lifetime

Lifetime CAM Use When All CAM Options Included in the Definition of CAM

For lifetime use when all CAM options included in the definition of CAM use, gender, attitude toward CAM, and social network use repeated their highly significant independent effects (Table 23). Being a Freshman showed a significant relationship in all models; the variable became more strongly associated with the dependent variable in models six, seven, and eight with the addition of social network use, encounter outcome expectancies, and personal outcome expectancies. Sophomores weakened but maintained a significant relationship throughout each model and juniors were significant in only model two. Business majors showed a significant negative relationship across models four through nine. University attended showed no significant relationship, but the p-value for TAMU often nearly significant at values as close as .051. Similar to the model involving college use, encounter outcome expectancies showed a significant relationship in model seven, but that significance disappeared in model eight with the addition of personal outcome expectancies. Ethnicity did not show any significant effects.

Lifetime CAM Use when Exercise Excluded from the Definition of CAM

For lifetime use of CAM with exercise excluded from the variable, gender, freshman, sophomore, attitude toward CAM, and social network use were again significant across the board (Table 24). Encounter outcome expectancies was significant ($p<.05$) until personal outcome expectancies was added to the model. The variable, university affiliation, was not significantly associated with the dependent variable in these models; however, agriculture/life science majors showed a negative significant

relationship ($p<.05$) when encounter outcome expectancies was significant ($p<.05$) in model seven. Business majors showed a negative significant ($p<.05$) relationship once the socio-cognitive independent variables were added to models.

Lifetime CAM Use When Exercise and Prayer Excluded from the Definition of CAM

For lifetime use of CAM when exercise and prayer were excluded from the dependent variable, gender, freshman, sophomore, agriculture/life science, attitude toward CAM, and social network use demonstrated significant independent effects (Table 25). Encounter outcome expectancies was significant ($p<.05$) until personal outcome expectancies was added to the model. Junior classification was significant until additional variables were added to the model. TAMU was significant until additional variables were added to the model.

Lifetime CAM Use When Only CAM Therapies Included in Definition of CAM

For CAM use during the lifetime when only specific CAM therapies were considered in the dependent variable, gender, sophomore classification, agriculture/life science major, attitude toward CAM, and social network use showed significant independent effects (Table 26). Freshman became significant after social network use was added to the model, however, junior classification was only significant until additional independent variables were added. Encounter outcome expectancies was significant ($p<.05$) until personal outcome expectancies was added to the model.

Table 23. Hierarchical regression coefficients for CAM use during the lifetime when all variables included in the definition of CAM.

Predictors	Model 1 Adj R^2=.073		Model 2 Adj R^2=.103		Model 3 Adj R^2=.149		Model 5 Adj R^2=.235		Model 6 Adj R^2=.322		Model 7 Adj R^2=.330		Model 8 Adj R^2=.333	
	B	ß	B	ß	B	ß	B	ß	B	ß	B	ß	B	ß
Constant	4.194		5.234		6.412		2.800		2.235		-10.871		-7.182	
	(.862)		(.893)		(1.166)		(1.514)		(1.374)		(6.306)		(6.716)	
Gender	2.243		2.251		2.213		1.479		1.374		1.250		1.215	
	(.429)	.274***	(.424)	.275***	(.416)	.270***	(.425)	.180***	(.401)	.168***	(.403)	.153**	(.402)	.148**
Ethnicity														
White	.986		.903		.830		1.187		1.342		1.394		1.474	
	(.859)	.105	(.846)	.096	(.831)	.008	(.799)	.126	(.753)	.142	(.749)	.148	(.749)	.156*
Black	-1.084		-1.097		-1.278		-1.437		-.415		-.493		-.434	
	(1.378)	-.051	(1.359)	-.051	(1.630)	-.060	(1.556)	-.067	(1.472)	-.019	(1.465)	-.023	(1.462)	-.020
Hispanic	1.423		1.299		-.068		-.434		-.373		-.389		-.409	
	(1.004)	.121	(.989)	.110	(1.047)	-.006	(1.000)	-.037	(.941)	-.032	(.936)	-.033	(.934)	-.035
Undergraduate Classfication														
Freshman			-1.818		-1.507		-1.443		-1.784		-1.756		-1.702	
			(.569)	-.183**	(.564)	-.152**	(.545)	-.145**	(.516)	-.180***	(.513)	-.177***	(.513)	-.171***
Sophomore			-1.702		-1.421		-1.343		-1.287		-1.216		-1.194	
			(.560)	-.174**	(.552)	-.146*	(.534)	-.138*	(.503)	-.132*	(.501)	-.125*	(.500)	-.122*
Junior			-1.049		-.913		-.413		-.393		-.305		-.283	
			(.525)	-.116*	(.523)	-.101	(.504)	-.046	(.475)	-.044	(.474)	-.034	(.473)	-.031
University Attending														
TAMU					-1.676		-1.609		-1.409		-1.212		-1.290	
					(.876)	-.202	(.852)	-.194	(.802)	-.170	(.803)	-.146	(.803)	-.156
Prairie View					-1.051		-1.149		-1.903		-1.597		-1.704	
					(1.716)	-.047	(1.670)	-.051	(1.576)	-.085	(1.574)	-.071	(1.572)	-.076
Tarleton State					-1.712		-1.155		-.821		-.651		-.649	
					(1.270)	-.089	(1.226)	-.060	(1.155)	-.043	(1.151)	-.034	(1.149)	-.034
Galveston					-.969		-2.272		-1.799		-1.514		-1.500	
					(1.550)	-.037	(1.594)	-.087	(1.502)	-.069	(1.500)	-.058	(1.497)	-.057
Kingsville					1.671		1.600		1.367		1.514		1.407	
					(1.181)	.118	(1.127)	.113	(1.061)	.097	(1.058)	.107	(1.057)	.099
International					-.474		-.975		-1.318		-.840		-.706	
					(1.548)	-.019	(1.482)	-.040	(1.395)	-.053	(1.406)	-.034	(1.405)	-.029
West Texas					.563		-.196		.096		.158		.235	
					(1.106)	.038	(1.084)	-.013	(1.021)	.006	(1.016)	.011	(1.015)	.016
Major in School														
Ag/Life Science							-1.423		-1.522		-1.699		-1.595	
							(.842)	-.115	(.793)	-.123	(.793)	-.137*	(.794)	-.129*
Architecture							-1.905		-1.338		-1.391		-1.213	
							(1.331)	-.077	(1.256)	-.054	(1.249)	-.056	(1.251)	-.049
Business							-1.802		-1.669		-1.689		-1.702	
							(.814)	-.159*	(.766)	-.147*	(.762)	-.149*	(.760)	-.150*
/Human Develop.							-.504		-.186		-.123		-.080	
							(.809)	-.044	(.763)	-.016	(.759)	-.011	(.758)	-.007
Engineering							-1.242		-1.192		-1.163		-1.081	
							(.742)	-.135	(.698)	-.130	(.695)	-.127	(.695)	-.118
eral Studies/Und.							-.602		-.120		-.140		-.151	
							(1.089)	-.031	(1.027)	-.006	(1.022)	-.007	(1.019)	-.008
Liberal Arts							-.250		-.015		-.026		.102	
							(.780)	-.024	(.735)	-.001	(.731)	.002	(.731)	.010
edicine/Vet Med.							.187		.784		.659		.665	
							(1.376)	.008	(1.298)	.032	(1.292)	.027	(1.289)	.027
Attitude Toward CAM							.281		.216		.207		.207	
							(.046)	.302***	(.045)	.232***	(.045)	.222***	(.045)	.222***
Social Network Use									.655		.646		.630	
									(.101)	.309***	(.100)	.305***	(.100)	.297***
Encounter Outcome Expectancies											.335		.188	
											(.157)	.100*	(.182)	.056
Personal Outcome Expectancies													.171	
													(.109)	.086

*p<.05
**p<.01
***p<.001

Table 24. Hierarchical regression coefficients for CAM use during the lifetime when exercise for health excluded from the definition of CAM.

Predictors	Model 1 Adj R^2=.075 ß	Model 2 Adj R^2=.103 ß	Model 3 Adj R^2=.150 ß	Model 4 Adj R^2=.148 ß	Model 5 Adj R^2=.241 ß	Model 6 Adj R^2=.327 ß	Model 7 Adj R^2=.334 ß	Model 8 Adj R^2=.338 ß
Constant								
Gender	.279***	.280***	.275***	.251***	.185***	.172***	.157***	.153**
Ethnicity								
White	.095	.087	.078	.095	.117	.133	.138	.147
Black	-.055	-.056	-.065	-.064	-.072	-.025	-.029	-.026
Hispanic	.109	.099	-.017	-.023	-.048	-.043	-.045	-.046
Undergraduate Classfication								
Freshman		-.177**	-.146**	-.147*	-.141**	-.175***	-.172***	-.167***
Sophomore		-.173**	-.144*	-.151**	-.137*	-.131*	-.124*	-.122*
Junior		-.115*	-.101	-.082	-.044	-.042	-.032	-.030
University Attending								
TAMU			-.203	-.026	-.194	-.171	-.147	-.156
Prairie View			-.046	-.053	-.050	-.084	-.070	-.075
Tarleton State			-.090	-.085	-.060	-.043	-.034	-.034
Galveston			-.033	-.065	-.081	-.063	-.052	-.052
Kingsville			.117	.112	.113	.097	.108	.100
International			-.024	-.034	-.044	-.058	-.038	-.033
West Texas			.042	.021	-.011	.008	.013	.018
Major in School								
Ag/Life Science				-.108	-.108	-.116	-.130*	-.122
Architecture				-.068	-.070	-.047	-.050	-.042
Business				-.139	-.145*	-.134*	-.135*	-.137*
Education/ Human Develop.				-.046	-.042	-.014	-.009	-.005
Engineering				-.125	-.124	-.118	-.115	-.106
General Studies/Und.				-.015	-.017	.008	.006	.006
Liberal Arts				-.041	-.017	.005	.009	.016
Medicine/Vet Med.				.017	.010	.034	.029	.029
Attitude Toward CAM					.315***	.245***	.235***	.236***
Social Network Use						.305***	.301***	.293***
Encounter Outcome Expectancies							.102*	.058
Personal Outcome Expectancies								.086

*p<.05
**p<.01
***p<.001

Table 25. Hierarchical regression coefficients for CAM use during the lifetime when exercise for health and prayer for health excluded from the definition of CAM.

Predictors	Model 1 Adj R^2=.054		Model 2 Adj R^2=.081	Model 3 Adj R^2=.127	Model 4 Adj R^2=.126		Model 5 Adj R^2=.247		Model 6 Adj R^2=.320		Model 7 Adj R^2=.331		Model 8 Adj R^2=.336	
	F	ß	ß	ß	F	ß	F	ß	F	ß	F	ß	F	ß
Constant														
Gender	.242***		.243***	.239***	.228***		.152**		.140**		.123*		.117*	
Ethnicity														
White	.082		.074	.068	.092		.116		.131		.138		.148	
Black	-.052		-.052	-.065	-.070		-.079		-.035		-.039		-.036	
Hispanic	.092		.082	-.027	-.020		-.048		-.044		-.045		-.047	
Undergraduate Classfication														
Freshman			-.173**	-.141*	-.151*		-.144**		-.176***		-.172***		-.166***	
Sophomore			-.172**	-.145*	-.157**		-.141**		-.136**		-.127*		-.124*	
Junior			-.117*	-.105	-.090		-.047		-.045		-.033		-.030	
University Attending														
TAMU				-.215*	-.211		-.197		-.175		-.147		-.158	
Prairie View				-.045	-.036		-.032		-.063		-.047		-.053	
Tarleton State				-.105	-.086		-.058		-.042		-.032		-.032	
Galveston				-.048	-.077		-.095		-.078		-.065		-.065	
Kingsville				.104	.099		.101		.086		.098		.089	
International				-.034	-.044		-.055		-.068		-.045		-.038	
West Texas				.034	.030		-.006		.012		.017		.023	
Major in School														
Ag/Life Science					-.151*		-.150*		-.158*		-.175**		-.165**	
Architecture					-.090		-.092		-.071		.074		-.065	
Business					-.122		-.129		-.118		-.120		-.121	
Education/ Human Develop.					-.038		-.033		-.008		-.001		.003	
Engineering					-.081		-.079		-.074		-.070		-.060	
General Studies/Und.					-.021		-.023		.000		-.001		-.002	
Liberal Arts					-.059		-.032		-.011		-.007		.002	
Medicine/Vet Med.					-.005		-.013		.009		.003		.003	
Attitude Toward CAM							.357***		.293***		.281***		.281***	
Social Network Use									.283***		.279***		.269***	
Encounter Outcome Expectancies											.120*		.067	
Personal Outcome Expectancies													.103	

*p<.05
**p<.01
***p<.001

Table 26. Hierarchical regression coefficients for CAM use during the lifetime when only CAM therapies included in the definition of CAM.

Predictors	Model 1 Adj R^2=.055 ß	Model 2 Adj R^2=.077 ß	Model 3 Adj R^2=.103 ß	Model 4 Adj R^2=.105 ß	Model 5 Adj R^2=.213 ß	Model 6 Adj R^2=.274 ß	Model 7 Adj R^2=.281 ß	Model 8 Adj R^2=.282 ß
Constant								
Gender	.251***	.248***	.247***	.247***	.175***	.164***	.149**	.146**
Ethnicity								
White	.077	.076	.064	.093	.116	.130	.136	.142
Black	-.031	-.030	-.012	-.014	-.023	.017	.014	.016
Hispanic	.076	.070	-.014	-.001	-.028	-.024	-.025	-.026
Undergraduate Classfication								
Freshman		-.114	-.090	-.103	-.097	-.126*	-.123*	-.119*
Sophomore		-.184**	-.162**	-.174**	-.159**	-.154**	-.146**	-.145**
Junior		-.121*	-.112	-.102	-.061	-.059	-.049	-.047
University Attending								
TAMU			-.157	-.152	-.139	-.119	-.094	-.101
Prairie View			-.074	-.064	-.061	-.089	-.075	-.079
Tarleton State			-.072	-.051	-.025	-.010	-.001	-.001
Galveston			-.023	-.051	-.068	-.053	-.042	-.041
Kingsville			.077	.076	.078	.064	.075	.069
International			-.017	-.023	-.034	-.045	-.026	-.022
West Texas			.066	.067	.033	.049	.053	.057
Major in School								
Ag/Life Science				-.177*	.177*	-.184**	-.199**	-.192**
Architecture				-.089	-.091	-.071	-.073	-.068
Business				-.095	-.102	-.092	-.094	-.095
Education/ Human Develop.				-.075	-.071	-.047	-.042	-.039
Engineering				-.058	-.056	-.052	-.048	-.042
General Studies/Und.				-.041	-.043	-.022	-.023	-.024
Liberal Arts				-.071	-.045	-.026	-.022	-.017
Medicine/Vet Med.				.002	-.007	.014	.008	.009
Attitude Toward CAM					.338***	.279***	.269***	.269***
Social Network Use						.260***	.256***	.250***
Encounter Outcome Expectancies							.103*	.071
Personal Outcome Expectancies								.062

*p<.05
**p<.01
***p<.001

Summary

For CAM use during college, several patterns arose for different demographic groups. Women are significantly more likely to be CAM users than men during the college years. Use seems to increase as students continue their education. Seniors are more likely than juniors, sophomores, and freshmen to have used CAM during college. There is some effect from university attending and major in school. Texas A&M–Kingsville students were more likely to be CAM users than non-Kingsville students. Engineering, business, and agriculture/life science majors showed some significant negative non-zero standardized beta weights of CAM use in comparison to their academic counterparts. Attitude toward CAM and social network use are highly significant predictors of CAM use in all definitions of CAM. Encounter outcome expectancies was a significant predictor of CAM use though the personal outcome expectancies variable seemed to detract from the models.

For lifetime use of CAM, the best determinants of CAM use within this sample were gender, attitude toward CAM, and social network use. Encounter outcome expectancies are useful unless personal outcome expectancies are added to the model. Personal outcome expectancies did not add significantly to any model. There are fewer significant differences between undergraduate classifications and majors in school. One significant difference arose in ethnicity when all variables were included in the definition of CAM on one significant difference in university attending when prayer and exercise excluded. Agriculture/Life Science and Business majors arose as significant predictors of CAM use during the lifetime.

CHAPTER V

CONCLUSIONS, LIMITATIONS, AND DISCUSSION

The purpose of this study was to assess the level of CAM use among a selected sample of undergraduate students within the Texas A&M University System and determine significant predictors of use. The research was guided by these five questions:

1) What is the prevalence of CAM use among undergraduate students enrolled within the Texas A&M University System?
2) What is the relationship between perceived outcome expectancies and CAM use among the college population?
3) How is CAM use affected by observational learning?
4) What is the relationship between attitude toward CAM and reported CAM use among these students?
5) Which demographic groups are more likely to use CAM?

Findings provide an understanding of the health attitudes of a selected group of Texas university students and present a facet of this population, which has not yet been studied in this way. By increasing awareness and understanding of CAM use and its influences among university undergraduate students, health educators can take an active role in the changing trends of health care in America.

Conclusions

Research Question 1:

What is the Prevalence of CAM Use among Undergraduate Students Enrolled within the Texas A&M University System?

Echoing previous research (Chng et al., 2003), results of this study show CAM use is prevalent among college students and at much higher levels than those of the general U.S. adult population. According to the Kessler et al. (2001), 67.6% of respondents reported using at least one CAM therapy in their lifetime while Barnes et al. (2004) found 75% of adults have used some form of CAM during their lifetime (when prayer was include in the definition). Using the same variables in the CAM definition as Barnes et al. (plus the addition of the South Beach Diet in diet-based therapies and exercise for health reasons), over 95% of the undergraduate students in this sample reported ever using CAM. The prevalence of CAM use is higher than the general adult population in almost all of the CAM therapies except Ayurveda and chelation. Major differences were found in use of diet-based therapies, megavitamins, massage, and several of the mind-body therapies in which the college sample reported rates of use several times greater than Barnes et al.'s population (Table 27).

Among the college students in this study, the five most common therapies ever used in the lifetime were prayer (82.6%), massage (53.9%), NVNM (44.1%), deep breathing exercises (35.9%), and diet-based therapies (30.7%). In Barnes et al. (2004) the five most commonly reported CAM therapies were prayer for health reasons (55.3%), NVNM products (25.0%), chiropractic care (19.9%), deep breathing exercises (14.6%), and meditation (10.2%). Many college students and adults in the general population use

prayer, NVNM, and deep-breathing exercises. In contrast, almost one-third of college students reported use of diet-based therapies compared to only 6.8% of the general adult population. In this college sample, the following therapies were used by less than five percent of the participants: acupuncture, naturopathy, biofeedback, hypnosis, tai chi, and healing therapy/Reiki. Ayurveda, chelation, and qi gong had been tried by less than one percent of the sample. In Barnes et al.'s sample, less than five percent of respondents reported use for six therapies (acupuncture, homeopathy, megavitamins, guided imagery, hypnosis, and tai chi) and one percent or less reported use of an additional six therapies (Ayurveda, naturopathy, chelation, folk medicine, biofeedback, qi gong).

For both groups, it seems CAM options involving a practitioner are used less than those not requiring an expert or health care provider. The college population seems much more involved with issues of image or weight-loss with use of NVNM and diet-based therapies. The most popular diets for both groups are Atkins and vegetarianism. Both groups seem to rely heavily on prayer for health reasons.

Table 27. Comparison of CAM use between this study's sample and Barnes et al.'s (2004) general adult population.

Variables Included in definition of CAM use	Versnik Nowak 2005 %	Barnes et al. 2004 %
All (n=33)	98.3	--
No Prayer (n=29)	96.2	--
No Exercise (n=32)	95.4	74.6
No Prayer or Exercise (n=28)	83.8	--
Alternative medical systems		
Acupuncture	2.6	4.0
Ayurveda	0	0.4
Homeopathy	7.2	3.6
Naturopathy	4.3	0.9
Biologically based therapies		
Chelation	0	0.1
Folk Medicine	9.9	0.7
Nonvitamin, nonmineral produc	44.1	25.0
Diet-based Therapies	30.7	6.8
Vegetarianism	10.4	2.6
Macrobiotics	0.6	0.7
Atkins	20.3	3.6
Pritikin	0.6	0.3
Ornish	0.6	0.1
Zone	3.8	0.5
South Beach	8.1	--
Megavitamins	22.0	3.9
Performance Enhancers	16.8	--
Manipulative and body-based therapies		
Chiropractic	26.4	19.9
Massage	53.9	9.3
Mind-body therapies		
Biofeedback	3.8	1.0
Meditation	22.0	10.2
Guided Imagery	9.6	3.0
Progressive Relaxation	13.0	4.2
Deep Breathing Exercises	35.9	14.6
Hypnosis	4.3	1.8
Yoga	28.7	7.5
Tai Chi	4.9	2.5
Qi Gong	0.9	0.5
All Prayer (n=4)	82.6	55.3
Prayed for own health	77.4	52.1
Others prayed for your hea	68.1	31.3
Group prayer	57.7	23.0
Healing ritual	7.8	4.6
Healing Therapy/Reiki	2.0	1.1

Research Question 2:

What is the Relationship between Perceived Outcome Expectancies and CAM Use among the College Population?

In this study, two new scales measuring outcome expectancies in relation to health care were developed and the data were tested for reliability and validity. The encounter outcome expectancies scale assessed how important participants believed aspects of the patient-provider relationship, treatment, and personal outcomes to be. Participants reported strong expectancy scores relating to expectations they have of health care providers and health care treatment. They expect their health situation to be improved by any treatment provided, expect risks to be minimal and explained clearly, and expect the visit to be worth the monetary cost. College students surveyed expect health care providers to support their overall health, spend adequate time with them, respect their health care beliefs, and look beyond their illness. Participants who reported higher outcome expectancy scores related to the health care encounter were significantly more likely to be CAM users. This variable did not hold its significance, however, once personal outcome expectancies were added to the model.

Participants felt personal outcome expectancies (i.e., immediate improvement, concerns being effectively addressed, and visit being worth the time) were important but not as important as the encounter outcome expectancies. While participants expect improvement from the treatment (as indicated in the encounter outcome expectancies), they do not expect immediate improvement. Almost equal, the participants in this study valued their time devoted to a health care appointment slightly more than they valued the cost of the appointment. While participants reported fairly high scores for personal

outcome expectancies, this scale was not a significant predictor of CAM use in this sample.

Research Question 3:

How is CAM Use Affected by Observational Learning?

Use of CAM by members of a participant's social network was shown to be a highly significant predictor of CAM use. People who reported knowing other CAM users were more likely to be users of CAM themselves. The majority (70%) of participants reported knowing at least one other person who is a CAM user and most knew multiple friends, family, etc. who are CAM users. Over 45% of respondents reported having friends who are CAM users and 31 to 37% reported having parents, grandparents, other relatives, and other people in their social network who use CAM, respectively.

Research Question 4:

What is the Relationship between Attitudes toward CAM

and Reported CAM Use among These Students?

The data generated by the attitude toward CAM scale was highly valid and reliable for use among this population. The overall attitude toward CAM among study participants was slightly negative, however, approximately 40-50% of respondents reported neutral scores for each of the five statements. The large amount of neutral responses shows many students in this population are unsure of their beliefs regarding CAM. This could be due to a lack of knowledge regarding CAM and a feeling of low efficacy in reporting strongly one way or another. While the overall attitude was slightly

negative, attitude toward CAM is a strong predictor of CAM use in this population. Participants who reported more positive attitudes toward CAM were significantly more likely to be CAM users. While other studies (Astin, 1998; McGregor & Peay, 1996; Chng et al., 2003) demonstrate bad experiences, negative attitudes, and dissatisfaction with conventional medicine were not significant predictors of CAM use, they did not explore how attitude toward CAM predict CAM use.

Research Question 5:

Which Demographic Groups are More Likely to Use CAM?

Gender was a significant predictor of CAM use during college and during the lifetime. Most previous studies found CAM users are more likely to be female (Kelner & Wellman, 1997a & b; Oldendick et al., 2000; Newberry et al., 2001; Rafferty et al., 2002; Chng et al., 2003; O'Callaghan & Jordan, 2003; Barnes et al., 2004; Huang & Slap, 2004) and, in this study, the findings were no different. This could be due to negative feelings women experience with health care providers (Coyle, 1999). According to Coyle (1999), women often perceive practitioners as sexist individuals who objectify them and question the patient's competency. Ethnicity was not a significant predictor of use in this study echoing the findings in a similar college population by Chng et al., 2003, but contradicting previous research in other populations (Oldendick et al., 2000; Newberry et al., 2001; Rafferty et al., 2002; Huang & Slap, 2004).

Undergraduate classification was a consistent significant predictor for college use of CAM but less consistent significant predictor of lifetime use. This coincides with previous research showing increased CAM use was associated with higher educational

attainment (Kelner & Wellman, 1997a & b; Astin 1998; Owens, Taylor, & DeGood, 1999; Oldendick et al., 2000; Rafferty et al., 2002; Barnes et al., 2004) and demonstrating graduate students were more likely to have used CAM than undergraduates (Chng et al., 2003). The findings of this study show senior classification is a significant predictor of CAM use during college. If graduate students had been included in the sample, it can be hypothesized they would have reported higher prevalence of use than their younger undergraduate counterparts. Students at Texas A&M–Kingsville were more likely to be CAM users than non-Kingsville students. Engineering, business, and agriculture/life science majors were significantly less likely to use CAM than non-engineering, non-business, and non-agriculture/life sciences majors, respectively.

Limitations

Limitations of a research design should be considered when interpreting study results. This study used self-reported data from anonymous, self-selected participants. The randomly selected sample was drawn from eight of the 10 TAMUS schools and findings can only be generalized to undergraduates from those same schools. Students were contacted via email and the web-based survey was the only method of data collection. The major challenge in this study was an issue with the email communication. Based upon returned emails, it is estimated approximately 50% of the possible participants did not receive their emails during the time of the study. Many of the solicitation emails were returned as undeliverable, some students perceived the solicitations as junk mail, and many students have other email accounts they use rather than the university accounts, which may prevent students from receiving the email. Issues

with unreliable email communications greatly reduced the calculated response rate for this study and it is believed the actual response rate, though undeterminable, is much higher.

Discussion

CAM use is prevalent among college students in the Texas A&M System with rates much higher than the general adult U.S. population. Gender, undergraduate classification, attitude toward CAM, social network use, and encounter outcome expectancies are all significant predictors of CAM use among this population. Females who have positive attitudes toward CAM, know others who use CAM, and value outcomes in line with the CAM philosophy are more likely to be users of CAM.

Implications for Practice

This knowledge is important for health educators and/or health care providers of the college population. Today's college students have high expectations of health care and are continuing the trend of increased CAM use in America. While many students report use of therapies, diets, prayer, and other practices for health reasons and report high expectancies regarding outcomes, they are often unsure of their beliefs and slightly negative in their attitude regarding CAM. Many of the CAM practices they use most commonly, such as supplements, diets, prayer, exercise, deep breathing, and yoga, are not practitioner-based and are most likely being conducted without professional guidance.

Educational or invention programs could target students who are female, or who attend a specific school, or who are in a specific major. Surveys at each university could

confirm CAM use and beliefs among the student population. Government agencies involved in CAM research could promote a comprehensive approach in which people are viewed as "whole persons who need a variety of opportunities for healthy development as well as a network of supports" (Centers for Disease Control and Prevention [CDC], National Center for Chronic Disease Prevention and Health Promotion, Division of Adolescent and School Health; Health Resources and Services Administration [HRSA], Maternal and Child Health Bureau, Office of Adolescent Health; National Adolescent Health Information Center [HAHIC], University of California, San Francisco. 2004, p. 5). Student health professionals, student recreational sports centers, health-related student organizations, health-related departments, and student life organizations could work collaboratively to meet the demands of today's college student who is an intelligent health consumer. The development of effective health information regarding CAM can be a start. Mettler & Kemper (2003) provide seven essential criteria for quality health information: evidence-based, referenced, up-to-date, free from commercial bias, reviewed by experts, decision focused, and user friendly.

Departments or divisions of health, health education, health promotion, wellness, or related fields should consider creating courses that address the growing use of CAM. If not a course, then incorporating a section regarding CAM into a current health course would be the minimum recommendation. While current courses might teach yoga, relaxation, or other components as part of a fitness or stress management lecture, it is missing the connection to health care and missing the many other health care options available to students. "During the transition from childhood to adulthood, adolescents and young adults…establish patterns of behavior and make lifestyle choices that affect their

current and future health" (CDC et al, 2004, p. 1). It is crucial, during this time of transition, college students are presented all health care options so they are prepared to make effective health care choices.

Health educators must be prepared to be the guidance in this situation. If the intent is to allow students to become smart health care consumers, it is in the best interests of the student to help them make the best decisions possible. Echoing Chng et al. (2003) health educators should be prepared to discuss CAM therapies as health care options. Whether conventional or CAM, health educators should be prepared to present all health care options, their benefits, and the general risks associated with them. This would mean health educators should be prepared to discuss not only conventional health care options that treat disease but also CAM options that deal with supporting the body's natural ability to heal and maintain health. If health care is only presented as an option for the treatment of disease, people will always think of health as a disease-related state instead of the health and wellness-related process it can be. Introducing health and health care options that promote health will allow people to begin thinking in terms of health-promoting behaviors instead of limiting themselves to last-ditch attempts or band-aid fixes via invasive surgery or a magic pill.

Failure to discuss CAM methods puts health care consumers at risk. This study shows college students have values that align with the CAM philosophy and are willing to use CAM health care options. Risks of uninformed health care use can easily be demonstrated among the college population. For example, NVNM substances are currently unregulated by government standards. According to Newberry et al. (2001), NVNM used by females are primarily used for weight loss, depression, and anxiety,

while those used by males are typically used for enhancing athletic performance. Of the 14% of respondents who experienced illness or side effects due to NVNM use, most ignored the symptoms and continued to use them. Potential eating disorders were a concern as individuals, with body weights considered healthy according to national standards, reported using weight loss supplements. Rates of NVNM use among this population were higher than that of the general population, which could be due to more exposure to marketing efforts and willingness to take risks with their bodies.

Conversely, there are many CAM benefits which go unclaimed. Many people, including college students and their friends or family members, live with pain or symptoms they have resigned to consider part of life. Often, they have been told by conventional physicians, the source of their pain/symptoms is unknown, they can not be treated, or surgery or medication is their only option. There are many other opportunities that can be helpful for promoting health and preventing illness. CAM and conventional care "have their strengths and weaknesses and should, therefore, be viewed as complementary to each other" (Anyinam, 1990). It would be helpful for students to understand how all health care systems can work together and that they are not mutually exclusive.

Implications for Research

CAM research has increased in the U.S. Between 1988 and 1998, the number of published research articles on CAM increased by 33% (Fontanarosa, 2001). Textbooks, journals, randomized controlled trials, and editorials have all increased and readers are demanding more (Fontanarosa, 2001). At the NIH, increased budgets, research, and

training are setting the stage for continued research in the future (Harlan, 2001). While government-sponsored research will tend to focus upon effectiveness of CAM treatments for specific illnesses, there is a major need for continued behavioral research regarding CAM.

Much more research is needed to explore psychosocial determinants or results of CAM use (Cauffield, 2000) and health behavior (Schroeder, 2000). Schuster, Dobson, Juaregui, & Blanks (2004, p. 349) say

> Understanding why individuals seek to use CAM practices and what benefits come from the…experience must be understood in a broader social and economic context, including patterns of health behaviors related to the concept of lifestyle. Moreover, an understanding of various health behaviors and "health care" is contingent upon how health is conceptualized.

This suggests research is needed to explore how people think and talk about health and health care so it is better understood how people act out health and health care behavior. Additional research on attitudes and social network use are needed among other populations and college samples to confirm findings. Use of additional theories or theoretical constructs to guide research will confirm the usefulness of current theories for understanding CAM use and provide foundation for the development of new theories better suited to such research. Research regarding social marketing (Schroeder, 2000), effective marketing materials, and media influence on CAM use would provide another interesting and necessary component for understanding CAM use among Americans.

Further research might test whether outcome expectancies expressed by participants toward health care providers also might be inferred to health educators. This study showed college students' outcome expectancies to align with the CAM philosophy even though conventional health care is the dominant force in our society. Research

questions might explore how the health education values we express in our health education classrooms align with conventional health care or with the CAM expectancies shared by college students. It does not seem too far fetched to speculate students expect their health to be improved after taking a health course, expect things to be explained clearly, and expect the course to be worth the time and money it cost. Perhaps today's college students expect health educators to support their overall health, spend adequate time with them, respect their health care beliefs, and look beyond health in terms of illness.

Summary

The health care horizon is changing as a demand of today's health care consumer and health educators should be at the forefront of this change. In 2000, Freshley and Carlson (p. 6) predicted the following regarding CAM use in the current decade:

1) CAM use will continue to increase;
2) Consumers will insist health insurance coverage for CAM and more comprehensive coverage will be provided;
3) Research will increase;
4) Line between CAM and conventional care will blur as CAM is mainstreamed;
5) Health or life coaches will help consumers deal with complex medical system;
6) Internet and marketing sources will feed increase in CAM use.

In a school or community health education setting, health educators can be prepared to provide information and guidance consumers will be requiring. In one aspect, health

educators are the health or life coaches who are and will be critical for helping consumers make sense of the complex range of health care choices (Freshley & Carlson, 2000).

Consumer choice of health care is not an either/or decision. Instead, it is best thought of as a pluralistic continuum that is ever-changing (Silenzio, 2002). CAM users have values that align with the philosophies of CAM therapies and college CAM users are no different. They value choice, pro-active involvement, and health-promoting behaviors. "The pattern revealed is one of multiple use: patients choose the kind of practitioner they believe can best help their particular problem" (Kelner & Wellman, 1997b). With the range of care available in the CAM and conventional realms, the "tapestry of care resources for public health is indeed rich" (Silenzio, 2002) and public preference for choice can not be ignored.

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APPENDIX A

EMAIL COMMUNICATIONS

A-1: Pre-notification

Day 1

Congratulations! You have been selected to represent your school in a study about complementary and alternative medicine.

In the next few days, you will receive another email with a link to a web-based survey. Your input is very valuable and completely anonymous, so watch for more information!

If you have any questions, please call 979-862-8574 or email tamuhealthsurvey@hlkn.tamu.edu.

TAMU Health Survey
Department of Health & Kinesiology
Texas A&M University
4243 TAMU
College Station, TX 77843
tamuhealthsurvey@hlkn.tamu.edu

A-2: Notification

Day 4

Please participate in a survey about complementary and alternative medicine. The information you provide will help improve health education programs in the Texas A&M University System. The survey is only available to students, like you, who have been selected to represent your school for this research study.

The web-based survey is located at http://tamuhealthsurvey.tamu.edu. To participate or find out more information, select the http://tamuhealthsurvey.tamu.edu link or paste it into your browser.

Your input is extremely valuable and all responses are completely anonymous. Please complete the survey by _____, 2004. If you have any questions, please call 979-862-8574 or email tamuhealthsurvey@hlkn.tamu.edu.

TAMU Health Survey
Department of Health & Kinesiology
Texas A&M University
4243 TAMU
College Station, TX 77843
tamuhealthsurvey@hlkn.tamu.edu

A-3: Thank You/Reminder

Day 9

Last week you received an email message requesting you visit a web-based survey about complementary and alternative medicine. You are one of 766 students randomly selected from an undergraduate population of 80,000 in the Texas A&M University System. Your participation is very important!

If you have already visited the website and completed the survey, thank you! If you have not been able to complete the survey yet, please do so now! Because less than 1% of all the students in the Texas A&M System are being asked to participate, your input is very valuable. It is important to accurately reflect the behaviors and attitudes of all students...including you. The survey is available on-line until ____.

The web-based survey is located at http://tamuhealthsurvey.tamu.edu. To participate or find out more information, select the http://tamuhealthsurvey.tamu.edu link or paste it into your browser.

Remember...your input is extremely valuable and all responses are completely anonymous. Please complete the survey by _____, 2004. If you have any questions, please call 979-862-8574 or email tamuhealthsurvey@hlkn.tamu.edu.

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A-4: More Help Needed

Day 14

If you have already completed our survey regarding complementary and alternative medicine, thank you for supporting research in higher education! The responses will be very helpful in improving health education programs and courses in the Texas A&M University System.

If you have not been able to complete the survey yet, we need your input! The web-based survey, located at http://tamuhealthsurvey.tamu.edu, will be available on-line until ____, _____, 2004. Here is all you have to do:

(1) Click on this link: http://tamuhealthsurvey.tamu.edu <http://tamuhealthsurvey.tamu.edu/>.

(2) On that webpage, select the "Go to survey" button at the bottom,

(3) Please take the entire survey. (You may skip any question you do not wish to answer.)

Remember...your input is extremely valuable and all responses are completely anonymous. If you have any questions, please call 979-862-8574 or email tamuhealthsurvey@hlkn.tamu.edu.

TAMU Health Survey
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A-5: Last Request

Day 27

IF YOU HAVE PREVIOUSLY COMPLETED THE ON-LINE SURVEY…

I truly thank you. Your participation is helping me complete the research requirements for my degree. I apologize for the multiple mailings. Because the survey is anonymous and participants are unknown, the email list could not be updated to reflect your participation.

I appreciate your help and understanding!

IF YOU WOULD BE WILLING TO SUPPORT MY RESEARCH…

Please take the next 5-10 minutes to complete the web-based survey regarding complementary and alternative medicine. It is completely anonymous and will be available on-line until midnight, Sunday, November 22. More information can be found by clicking the link below.

Here is all you have to do:

(1) Click on this link: http://tamuhealthsurvey.tamu.edu <http://tamuhealthsurvey.tamu.edu/>.

(2) On that webpage, select the "Go to survey" button at the bottom,

(3) Please take the entire survey. (You may skip any question you do not wish to answer.)

If you have any questions at all, please use the email address below.

Thank you!

TAMU Health Survey
Department of Health & Kinesiology
Texas A&M University
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APPENDIX B

CAM TERMS. SOURCE: BARNES et al., 2004, pp. 17-19.

Term	Definition
Acupuncture	"Based upon the theory that health is determined by a balanced flow of energy." Body has over 1000 acupoints, connected to the body's organs, which can be stimulated via needle insertion to rebalance the flow.
Atkins Diet	Diet based upon increased protein and fat and very limited carbohydrates.
Ayurveda	System of medicine developed in India over 5000 years ago. Individuals treated based upon determination of their metabolic body type. Body, mind, and spirit equally important.
Biofeedback	Use of electronic devices to train people to induce relaxation response.
CAM	"Therapies not usually taught in medical schools or generally available in U.S. hospitals." Includes range of therapies and belief systems.
CAM provider or practitioner	Person with knowledge regarding a CAM therapy, who may or may not have formal training or a license, and provides information or care usually for payment.
Chelation Therapy	Chelating (or binding) agents are injected into blood stream to remove toxic metals and waste from the bloodstream.
Chiropractic Care	"Adjustment of spine and joints to influence the body's nervous system and natural defense mechanisms."
Deep Breathing	Used to quiet the mind by focusing on slow, deep inhalations and exhalations.
Energy Healing/Reiki	Flow and focus of energy to restore normal energy balance and health. Energy channeled through hands of the practitioner.
Folk Medicine	Systems of healing found in all cultures (e.g., Native American healing). Employ various remedies, under a variety of names and labels, passed down generation to generation.
Guided Imagery	Visualization of images directed toward preferred outcome.
Homeopathy	System of medical practice. Use of diluted natural substances which cause symptoms in a healthy person to treat the symptoms in a sick person.
Hypnosis	Body is relaxed and then shifted into an altered state of consciousness. Attention is then directed by the hypnotist or hypnotherapist toward healthy behaviors.
Macrobiotic Diet	Emphasizes fresh, unprocessed foods, vegetables, and whole grains. Fluids restricted and animal products, caffeinated products, and sugars avoided.
Massage	"Pressing rubbing, and otherwise manipulating muscles and other soft tissues of the body, causing them to relax and lengthen."
Meditation	Suspending thoughts to experience calm and relaxation.
Megavitamin Therapy	"Use of vitamins in excess of the Recommended Daily Allowances (RDA) established by the National Academy of Sciences, Food, and Nutrition Board" to prevent or treat conditions.
Naturopathy	System of medicine. Body naturally self-regulates to maintain health and non-invasive CAM therapies are used for "harnessing the body's natural healing powers."
Nonvitamin, Non-mineral Supplements	Include herbs, herbal medicines, botanical products (e.g., soy, flax), enzymes, and glandulars. Examples include echinacea, ginseng, and garlic.
Ornish Diet	Promotes high fiber and low fat intake through fruits, beans, grains, and vegetables. Dairy products limited and animal products and nuts avoided.
Pritikin Diet	Promotes low-fat intake with high fiber and water to lower caloric density to less than 400 calories per pound. Vegetables, fruits, beans, and unprocessed foods recommended.
Progressive Relaxation	Tensing and relaxing of 15 major muscle groups in a progressive fashion to relax, reduce stress, or induce sleep.
Qi Gong	Originated in ancient China. Gentle physical movements, combined with mental focus and deep breathing, used to stimulate flow of life energy.
Reiki	See energy healing.
Tai Chi	Originated in China. Set of low-intensity, low-impact exercises, or forms, based on self-defense. Used for concentration, relaxation, and other health reasons.
Vegetarian Diet	Promotes consumption of plant products only. Variations within vegetarianism can include or exclude one or a combination of the following: dairy product, eggs, alcohol, sugar, caffeine, and/or processed foods.
Yoga	"Combination of breathing exercises, physical postures, and meditation"
Zone Diet	Promotes 30:30:40 ratio of low-fat protein, fats, and fiber-rich carbohydrates at every meal.

APPENDIX C

GEOGRAPHIC TERMS. SOURCE: BARNES et al., 2004, p. 16.

Term	Definition
Midwest	Geographic region of the United States. Includes Ohio, Illinois, Indiana, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Kansas, & Nebraska.
Northeast	Geographic region of the United States. Includes Maine, Vermont, New Hampshire, Massachusetts, Connecticut, Rhode Island, New York, New Jersey, & Pennsylvania.
Pacific States	Area of high concentration of CAM schools, legislation, and use. Includes Arizona, California, Hawaii, Oregon, & Washington. These are also considered Western states.
South	Geographic region of the United States. Includes Delaware, Maryland, District of Columbia, West Virginia, Virginia, Kentucky, Tennessee, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Oklahoma, Arkansas, & Texas.
West	Geographic region of the United States. Includes Washington, Oregon, California, Nevada, New Mexico, Arizona, Idaho, Utah, Colorado, Montana, Wyoming, Alaska, & Hawaii.

APPENDIX D

TEXAS A&M IRB APPROVAL

June 1, 2005

MEMORANDUM

To: Amy L. Versnik Nowak
Health & Kinesiology
MS 4243

From: Ms. Sharon Alderete, CIP
IRB Program Coordinator

Subject: IRB Request for Exemption

Protocol Number: 2004-0296

Title: Predictors of Complimentary and Alternative Medicine Use Among a Sample of Undergraduate Students

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The Institutional Review Board (IRB) has determined that the referenced protocol application meets the criteria for exemption and no further review is required. However, any amendments or modifications to the protocol must be reported to the IRB and reviewed before being implemented to ensure the protocol still meets the criteria for exemption.

This determination was based on the following Code of Federal Regulations:
(http://www.hhs.gov/ohrp/humansubjects/guidance/45cfr46.htm)

☐ 46.101(b)(1)	☑ 46.101(b)(2)	☐ 46.101(b)(3)
☐ 46.101(b)(4)	☐ 46.101(b)(5)	☐ 46.101(b)(6)

Comments: Consent Documents: IRB contact information must be corrected from Dr. Mike Buckley to Ms. Angelia M. Raines, Director of Research Compliance, (979)458-4067, araines@vprmail.tamu.edu

If you have any questions regarding this protocol application or the review process, please contact the IRB office at (979)458-4067.

APPENDIX E

PANEL OF SURVEY REVIEWERS

Don Ardell, Ph.D.
Director, Wellness Center
SeekWellness.com

Rhonda Rahn, M.S.
Health Education Coordinator
Student Health Services
Texas A&M University

David Hartzog
Caring Hartz Healthplex
Bryan, Texas

Susan Hartzog
Caring Hartz Healthplex
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Bill Hettler, M.D.
Director of Health Services
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Jane Jones, Ph.D.
Professor & Licensed Psychologist
School of Health Promotion & Human Development
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Judith Mullen, D.C., P.C., FIAMA
Community Chiropractic
College Station, TX

John Prochaska,
Health Educator & Graduate Student
Student Health Services
Texas A&M University

Jim Rakel, M.D.
Physician, CAM Provider
Verona Family Practice
Verona, Wisconsin

Sandra Smith, D.C., P.T.
Community Chiropractic
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Georgette Stephens
Store Manager
Brazos Natural Foods
Bryan, Texas

Justine Tutuska,
Director of Health Care Studies
Daemen College
Amherst, New York

Ashley D. Walker, M.Ed
Health Educator & Graduate Student
Student Health Services
Texas A&M University

APPENDIX F

INFORMATION SHEET

Welcome to the TAMU Health Survey!

Study title:
Predictors of Complementary and Alternative Medicine Use Among a Sample of Undergraduate Students

You are being asked to participate in a research study regarding complementary and alternative medicine. You have been selected at random from a public information list purchased from your university. A total of approximately 766 students from schools in the Texas A&M University System have been asked to take this survey which will help the researcher learn about college student use and attitudes towards complementary and alternative medicine.

If you are at least 18 years of age and you agree to participate in this study, you are being asked to complete an on-line survey. The survey consists of 25 questions and will take approximately 5-10 minutes to complete. This study provides you an opportunity to become more aware of your behaviors and beliefs related to complementary and alternative medicine. No anticipated risks are associated with this study and no compensation will be provided to participants.

This study is voluntary and anonymous. No identifying information is being asked of you and your responses can not be traced in any way, so please answer as honestly as possible. Your decision whether or not to participate will not affect your current or future relations with Texas A&M University System. If you decide to participate, you are free to refuse to answer any question that makes you uncomfortable. You can withdraw at any time without your relationship to the university being affected.

This study is a dissertation project. If you have any questions regarding the survey, you can contact Amy L. Versnik Nowak (Project Coordinator, Department of Health & Kinesiology, Texas A&M University, MS 4243, College Station, TX 77843, ph. 979-862-8574, email: tamuhealthsurvey@hlkn.tamu.edu) or Steve Dorman (Chair, Department of Health & Kinesiology, Texas A&M University, MS 4243, College Station, TX 77843, ph. 979-845-1333, email: sdorman@hlkn.tamu.edu).

This research study has been reviewed by the Institutional Review Board--Human Subjects in Research, Texas A&M University. For research-related problems or questions regarding your rights as a participant, you can contact the Institutional Review Board through Dr. Michael W. Buckley, Director of Research Compliance, Office of Vice President for Research at 979-845-8585 or mwbuckley@tamu.edu.

By clicking the “Go to Survey” link below, you are stating you are at least 18 years of age and you voluntarily agree to participate in this survey. Once you click on the link, you will automatically be taken to the Texas A&M University Health Survey. You may print this page for your records.

Go to Survey...

VITA

Name: Amy L. Versnik Nowak

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4243 TAMU
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Education: B.A., Communication, University of Wisconsin–Stevens Point, 1994
M.A., Communication, University of Wisconsin–Stevens Point, 1999
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